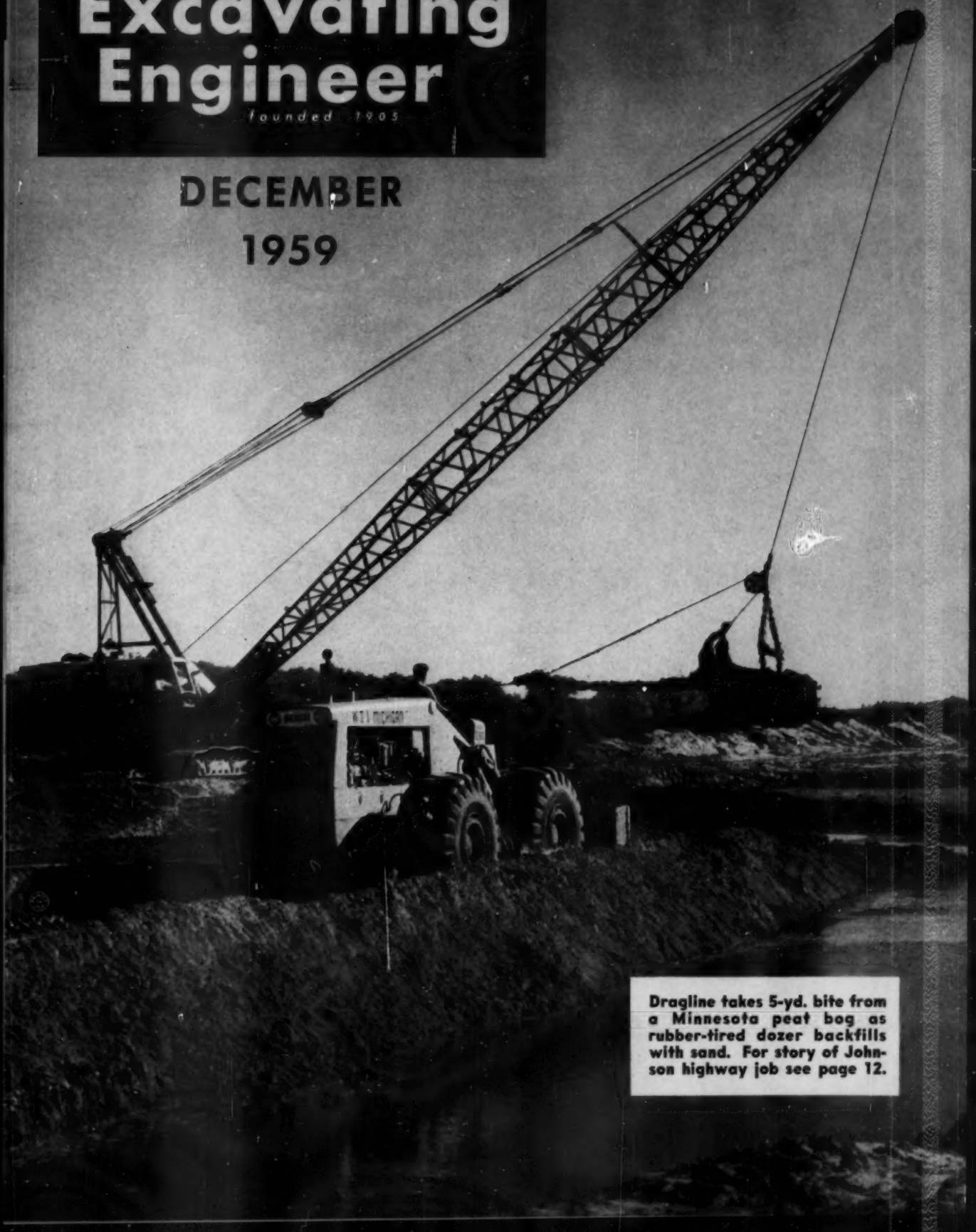
Excavating Engineer

founded 1905

DECEMBER 1959

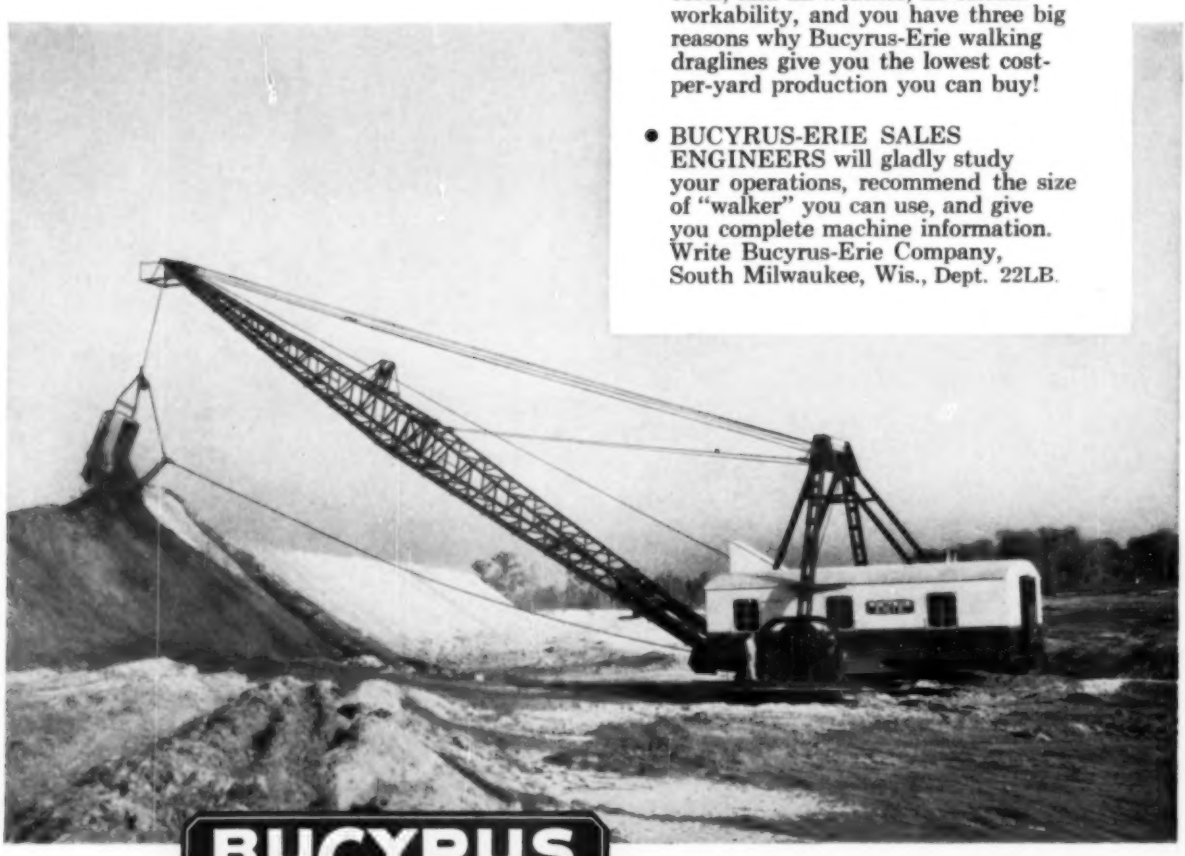


Dragline takes 5-yd. bite from a Minnesota peat bog as rubber-tired dozer backfills with sand. For story of Johnson highway job see page 12.

Here's why Bucyrus-Erie Walking Draglines produce at the

LOWEST COST PER YARD!

- BUCYRUS-ERIE WALKING DRAGLINES walk and work in any weather, over any terrain! They have the flotation to work in ground conditions impossible for rigs of any other type.
- SIMPLY DESIGNED machinery, built as units and rigidly held in alignment on the revolving frame, reduces maintenance. You get the month-after-month dependability necessary in remote locations, far from service facilities.
- Bucyrus-Erie walking draglines handle *big* buckets because weight is distributed to put extra balance and stability behind the front end. Booms are all-welded, tubular-laced for extra strength without excess weight. Main machinery weight is concentrated low to back up the big-output boom and bucket.
- PUT TOGETHER *steady* performance, low upkeep and operational costs, and all-weather, all-terrain workability, and you have three big reasons why Bucyrus-Erie walking draglines give you the lowest cost-per-yard production you can buy!
- BUCYRUS-ERIE SALES ENGINEERS will gladly study your operations, recommend the size of "walker" you can use, and give you complete machine information. Write Bucyrus-Erie Company, South Milwaukee, Wis., Dept. 22LB.

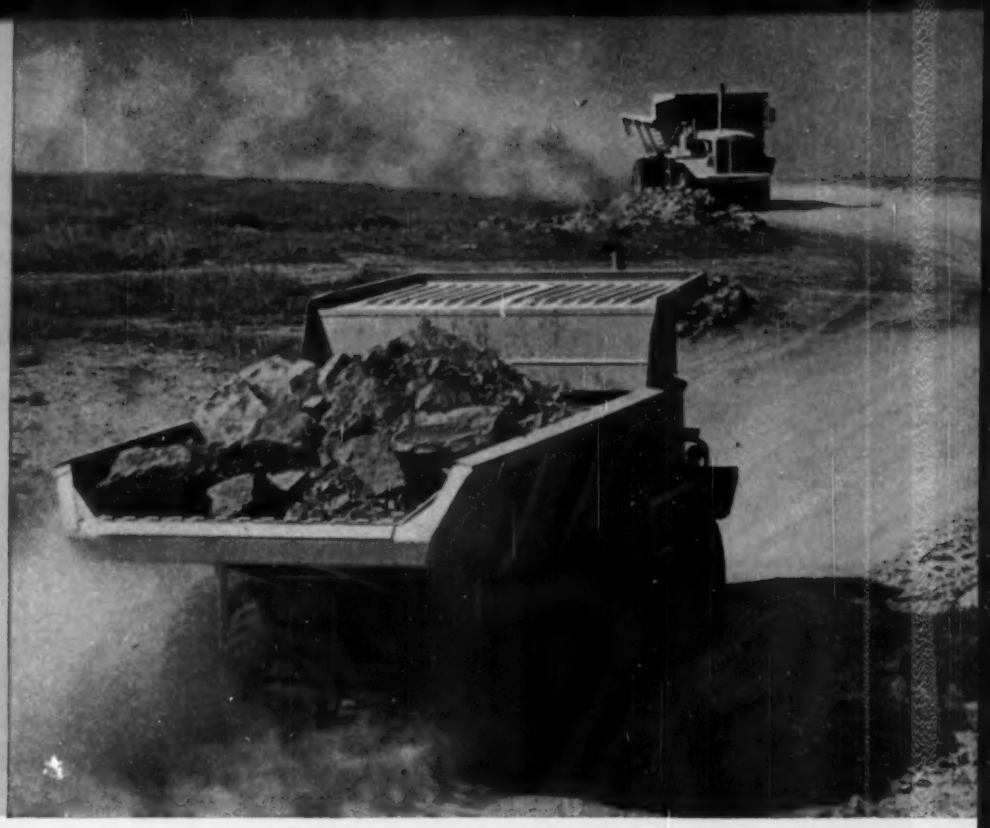


BUCYRUS ERIE®

Builds Better Equipment

Walker Cut Stone Co., Milford, Kansas, replaced *six* smaller overworked gasoline haulers with only two 19-ton Model 65 Payhauler trucks! Their "65's" deliver 150 tons of limestone per hour, from quarry to crusher.

How new rock-ribbed 65 Payhauler® pair



speeds "write-off," replacing six smaller rigs!

—for Walker Cut Stone Co., Milford, Kansas

Two new International 19-ton 65 Payhauler trucks —with the new weight-saving corrugated bodies, and the new 250-hp D-817 diesel engine—have replaced six smaller gasoline trucks for Walker Cut Stone Co., Milford, Kansas.

Results are amazing! Only two operators instead of six to pay! Only 40 gallons of low-cost diesel fuel used daily (total) by the two Payhauler rigs—against several times 40 gallons of high-priced gasoline formerly swilled by the carbureted outfits! And only two machines to maintain, instead of six! "Write-off" of the Payhauler investment speeds in "high gear!"

Payhauler features increase capacity!

Even against competitive haulers of similar rated capacity, the new 65 Payhauler gives you overwhelming advantages!

Of all off-road haulers in its size class, only the 65 Payhauler has the International-developed rock-ribbed corrugated body! This strength-multiplying principle lets the "65" shed 5,000 lbs. of power-wasting weight, and gain a full ton of payload capacity.

Prove the power-to-payload advantages the new rock-ribbed 65 Payhauler delivers! Compare the "65's" cycle-speeding combination of air-assist shifting; 11-second dumping, fast reversing; super-power braking; bonus-leverage, vibration-free power steering! And for 27-ton capacity, note how the 375-hp "95" leads the field. See your International Construction Equipment Distributor for a demonstration!

In only 11 seconds you dump the "65's" 19-ton load —with 3-stage, double-acting, constant-power hoist! Positive up-and-down snubbing guards against impact!

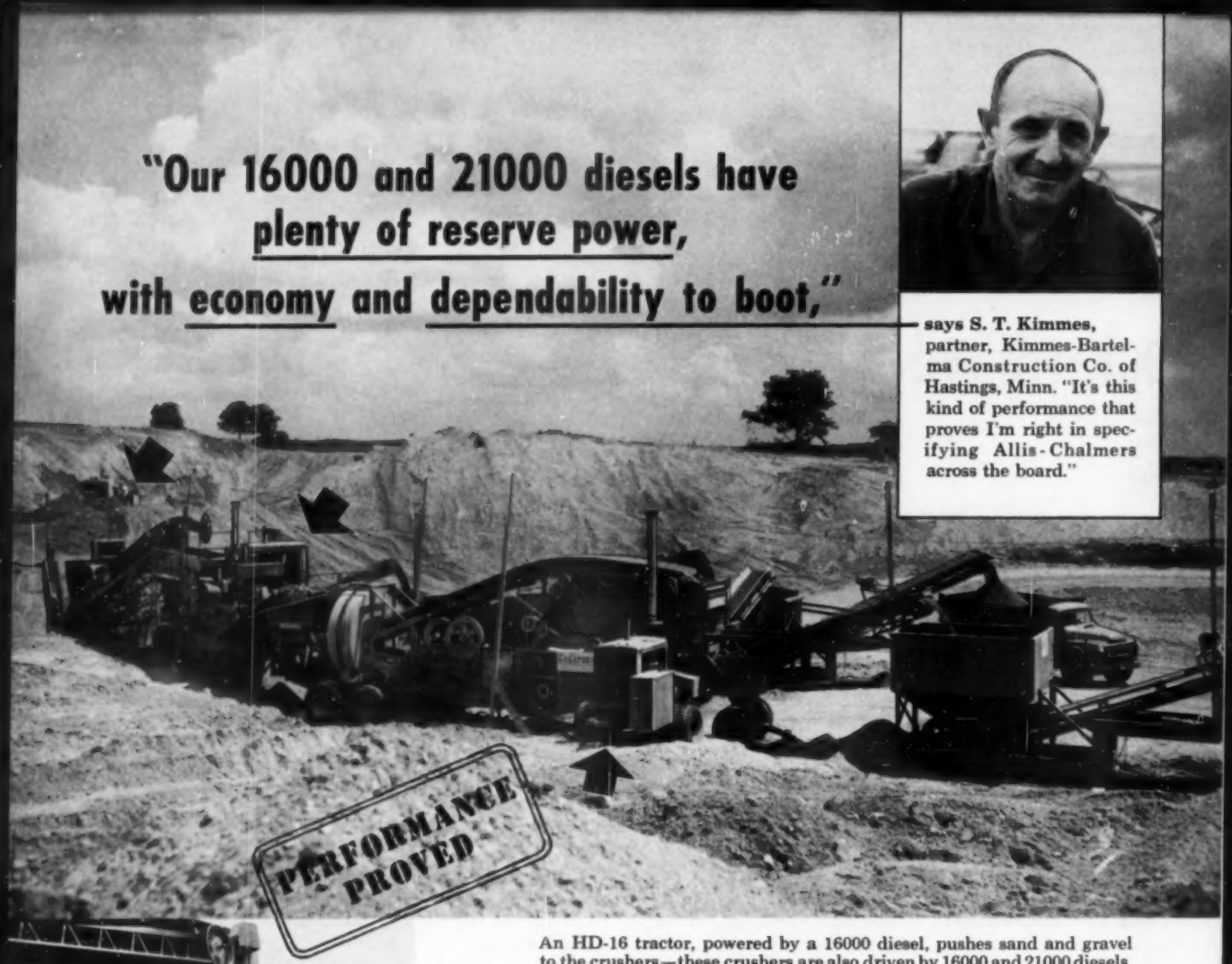
International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

"Our 16000 and 21000 diesels have plenty of reserve power, with economy and dependability to boot,"

says S. T. Kimmes, partner, Kimmes-Bartelma Construction Co. of Hastings, Minn. "It's this kind of performance that proves I'm right in specifying Allis-Chalmers across the board."



An HD-16 tractor, powered by a 16000 diesel, pushes sand and gravel to the crushers—these crushers are also driven by 16000 and 21000 diesels.

A 16000 diesel powers this hopper at the pug mill.

21000 — 340 hp
(turbocharged)
16000 — 230 hp

Supplying and placing more than a million tons of subbase material for runways at a new midwestern Air Force base is typical of the jobs handled by the Kimmes-Bartelma Construction Co., Hastings, Minnesota.

Kimmes' aggregate plant shown above turned out 8,000 tons per day. These Allis-Chalmers 16000 and 21000 engines logged over 1,500 hours in three months. The only downtime on this job was due to wet weather.

Why is Kimmes' operation Allis-Chalmers-powered all the way? Because as he puts it: "These engines are in there giving us real performance day in and day out with no strain — in the tractors, on the crushers, and at the pug mill." They deliver the power and torque they are supposed to without overworking. The completely new Allis-Chalmers open-chamber combustion system makes the 16000 and 21000 the most economical, cleanest-running, fastest-starting diesels in their class.

Let your Allis-Chalmers dealer tell you more. Let him refer you to users — find out what they think of these "Performance-Proved" engines. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

***POWER* FOR A GROWING WORLD**

BC-23

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Excavating Engineer

founded 1905

South Milwaukee, Wisconsin

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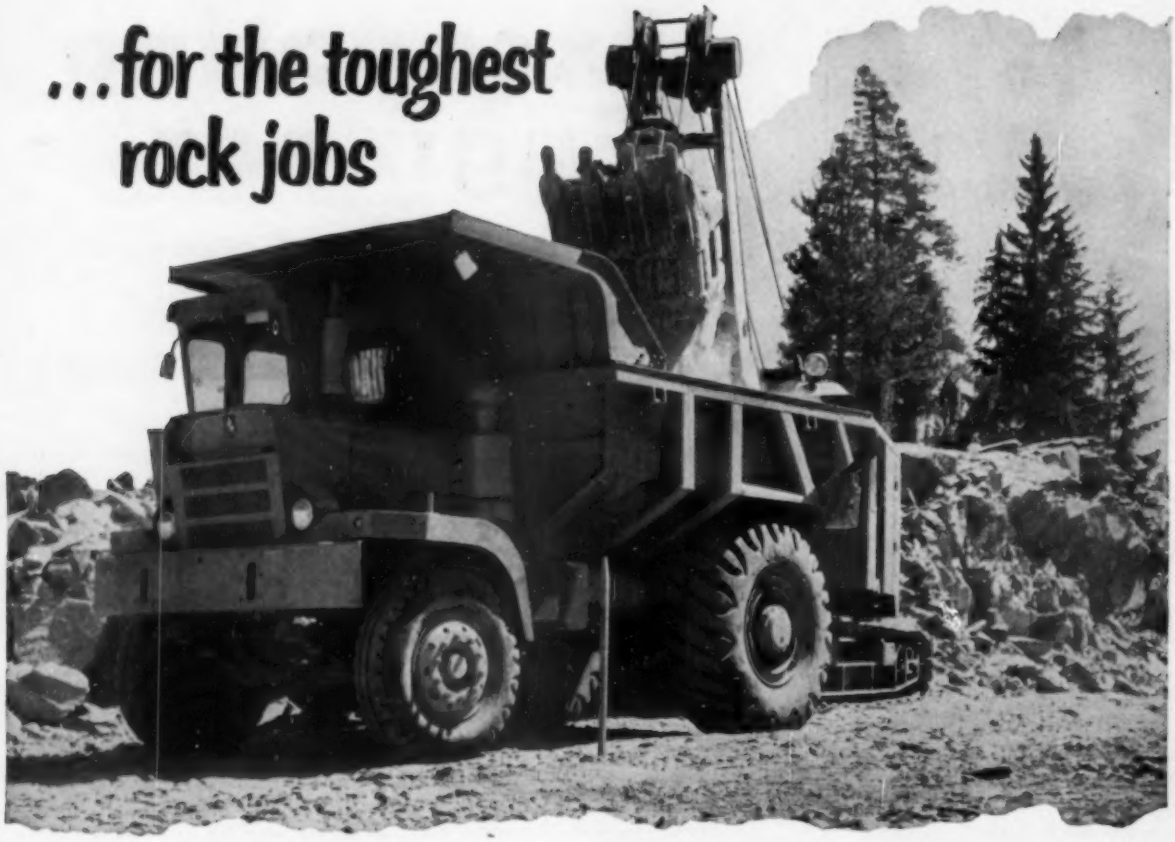
...for the toughest rock jobs

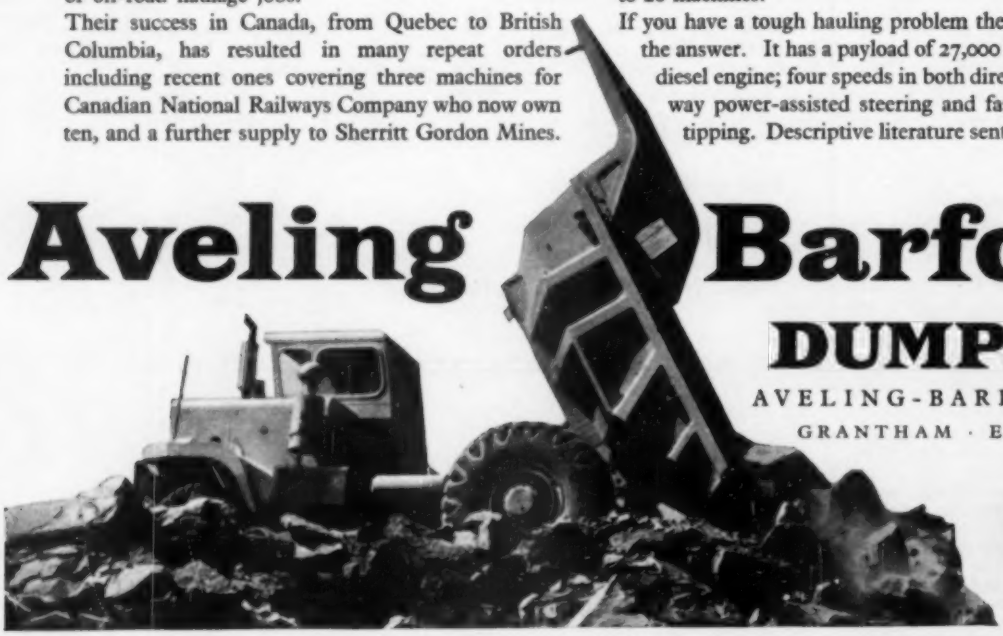


In quarries, mines, tunnels and on big construction projects all over the world, hundreds of Aveling-Barford "SL" Dumpers are handling the toughest of off-road haulage jobs.

Their success in Canada, from Quebec to British Columbia, has resulted in many repeat orders including recent ones covering three machines for Canadian National Railways Company who now own ten, and a further supply to Sherritt Gordon Mines.

Another success is a repeat order for ten "SL270" Dumpers for Canadian Foreign Ore Development Corporation Limited. This brings their fleet strength to 20 machines.

If you have a tough hauling problem the "SL270" is the answer. It has a payload of 27,000 lb., 163 h.p. diesel engine; four speeds in both directions; two-way power-assisted steering and fast hydraulic tipping. Descriptive literature sent on request.



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GRANTHAM · ENGLAND

ORIGINATORS AND WORLD'S LARGEST MAKERS OF ROAD ROLLERS

HERE'S A REALLY TOUGH JOB!

You're looking down one of the really tough jobs now under way. The job is the "Second Barrel" of the water line for San Diego, Calif. The ditch is 26 ft. deep at this point. In places it ran to 34 ft. The material is tough conglomerate—in some spots so hard that teeth were ground away in two hours.

Two Northwest Model 80-Ds are handling the tough assignment. There were miles of blue granite which had to be blasted, and because of the rugged terrain the machines often had to work on heavy grades.

The contractor is Lee H. Woods & Sons. Mr. Woods is a contractor and operator of long experience. What he says is borne out by the performance of the Northwests on his job and the many other rock jobs that Northwests have handled. Mr. Woods says, "I have sat in the seat of shovels for 28 years before going into the contracting business myself, and my many years of experience have convinced me that, when it comes to rock, Northwests are the best of all. That's why in one of the toughest jobs ever attempted in the West, I bought two 80-Ds."

—And, remember that a *real* Rock Shovel makes the going easier and the output greater in ANY DIGGING.

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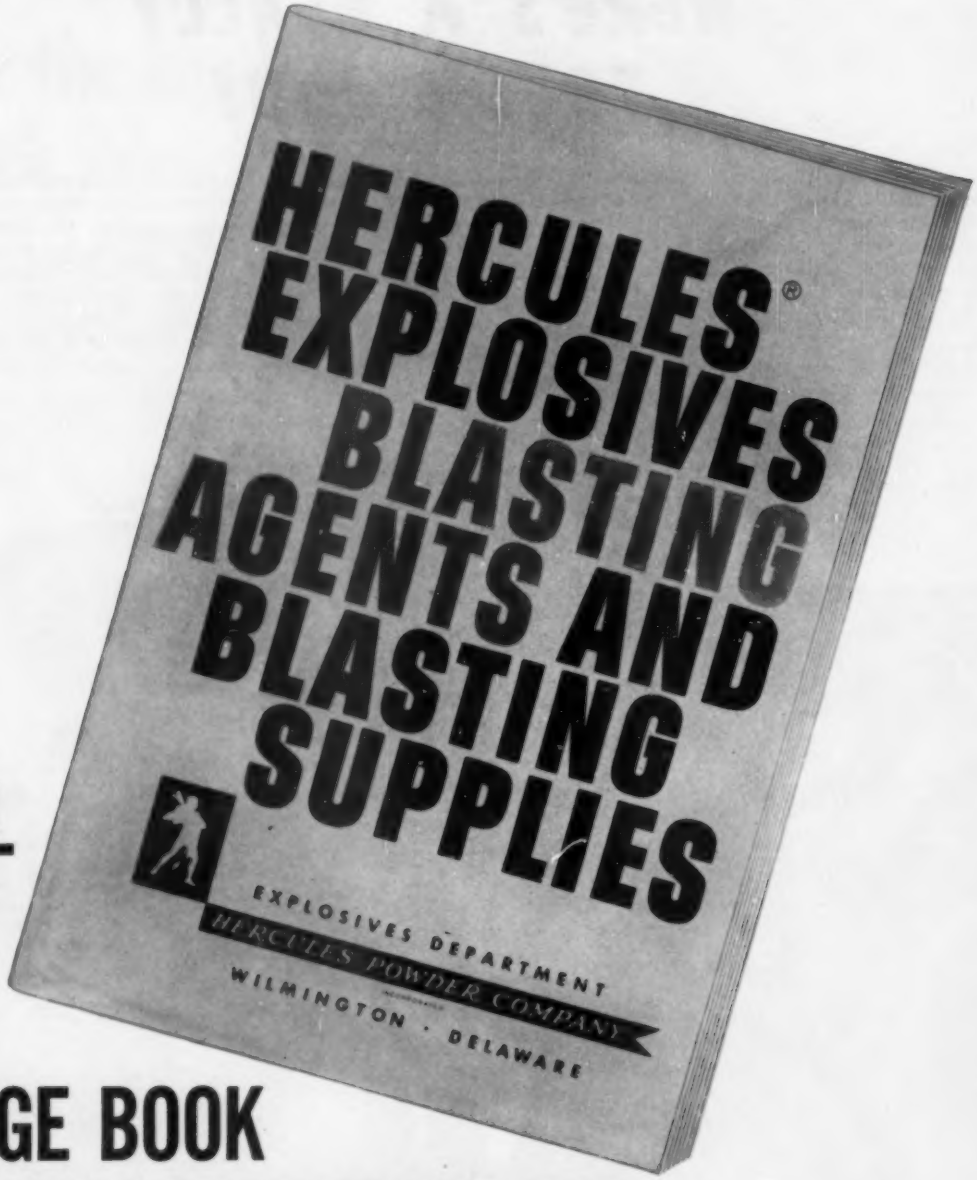

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Since its inception, Hercules has been, and continues to be, a pioneer in the development of improved materials for the industrial explosives user. To help you choose the proper explosives, blasting agents, and blasting supplies, we have gathered the latest information and published it in a handy 80-page reference guide.

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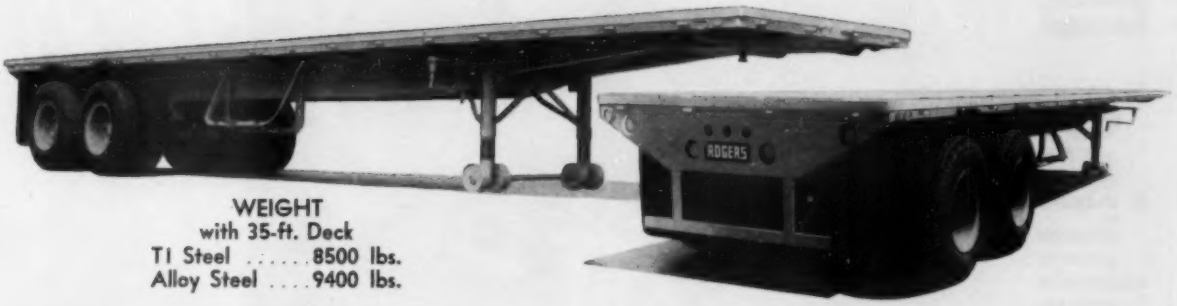
By ROGERS a new HIGH-FLAT

WITH ADVANCED FEATURES THAT DESERVE SPECIAL CONSIDERATION



WEIGHT
with 35-ft. Deck
T1 Steel .....8500 lbs.
Alloy Steel ....9400 lbs.

Inspect every detail and you'll find its design and construction to measure up to your highest concept of an excellent HIGH-FLAT.

The bogie is designed for full oscillation to distribute the load over all tires regardless of road conditions. The springs are resilient to cushion against road shock but equal to carrying the heaviest loads safely.

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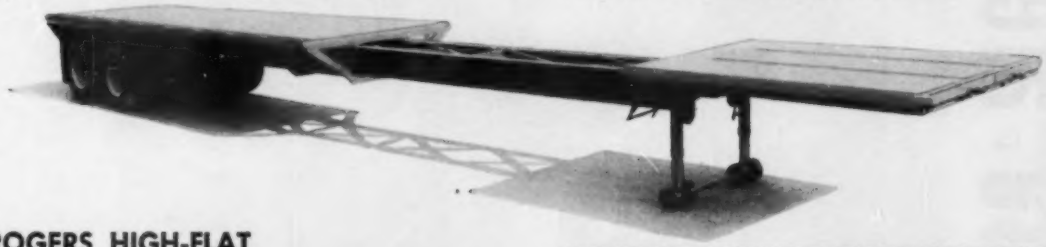
But the point that should interest you greatly is the use of T1 — a newly developed steel with the greatest strength in proportion to weight yet attained.

This permits the construction of a trailer of given capacity hundreds of pounds lighter than units with conventional or alloy steel. Greater payloads with increased profits result.

Contact your Rogers distributor or the factory for the interesting facts.



A ROGERS HIGH-FLAT MODIFICATION built for a prominent bridge and iron company to serve as a conventional trailer or extend to handle the long beams, rods, etc., frequently encountered.

The deck — normally 8 feet by 35 feet extends to 45 feet or 55 feet.

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NOW... there are 2 Koehring® Dumptors

◀ Big wide-flared body of the model 100 Dumptor makes an easy target for the sensational new Koehring 205 Skooper. From a "stand-still" position, Skooper makes 5 fast passes with 2-yard bucket, and Dumptor is fully loaded. The full-revolving loader does big bucket digging and loading without the usual drive-in back-out waste motion — and without the high maintenance of skid-turn operation. Skooper's complete digging and loading cycle is: crowd, hoist, swing and dump — then back to digging position — with no traveling.

15-TON . . .

with 2-way controls . . . pivoting seat . . . 24 mph speeds in both directions for fast, no-turn shuttle-hauling

Take another look at the big model 100 Dumptor® shown above. A recent addition to the Koehring line, this heavy-duty off-road hauler combines 30,000-lb. payload capacity, no-turn hauling, unique two-way controls and fast dumping action for moving big tonnages in open pits, or in underground mines. There's no need to turn at the loader, on the haul, or at the dump area, because Dumptor operates with equal ease in either direction. Operator always faces direction of travel — swings around *without leaving seat.* Dual steering wheels, throttle, brake pedals are located at *both* operating positions of *pivoting seat.* Directional travel and speed-range lever, and dump controls, are centrally located for 2-way operation. Constant-mesh transmission with smooth torque-converter drive gives speeds up to 24 m.p.h. in both directions. High or low speed range controlled by easy-acting hydraulic clutches.

15-ton Dumptor hauls up 28½% grades fully loaded — has power steering — big, safe, 4-wheel airbrakes, plus parking brake. And that's not all — there are two ways to dump — *instantaneous* gravity — or *controlled* gravity with hydraulic cylinders. Get the complete story from your Koehring distributor, or write us today.

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

8-TON . . .

Companion-model 60 Dumptor also offers cost-cutting advantages for your heavy-duty hauling. Smaller in size, but just as rugged as the larger Dumptor, this 8-ton has a ton of strength for every ton of payload capacity. There's better than 6 H.P. for every ton of loaded weight. It accelerates fast — climbs 23% ramps or grades fully loaded. Heavy-duty, constant-mesh transmission gives same 3-speed travel in both directions. No need to turn. Gravity dumping action is simple, trouble-free. Get all these advantages on your work — haul with Dumptors.

Mail to: KOEHRING Division, 3026 W. Concordia, Milwaukee 16, Wisconsin

Please send literature on: ■ 10-yard Dumptor ■ 6-yard Dumptor ■ Skooper

NAME _____ TITLE _____

COMPANY _____ DIV. _____

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Watch a BUCYRUS-ERIE transit crane at work!

Bucyrus-Erie Transit Cranes mount on 6x4, 6x6 and 8x4 carriers.

Discover the big edge in load control!

To make the right choice, *see* what these versatile machines can do. You'll see features in action that make Bucyrus-Erie Transit Cranes the best precision load handlers in the business.

As standard equipment, Bucyrus-Erie Transit Cranes offer you independent *power-controlled* lowering boom hoist for maneuvering the boom safely around machinery and pipe.

When you're working in a tight spot, setting up, you'll appreciate the friction swing brake that lets the operator hold both machine and load in the *exact* position you want, anywhere around the circle. There's no juggling for the next gear tooth . . . no jockeying of the swingers to hold steady.

You'll see many more features that make sense where safety and precision are concerned . . . where money and time savings are important.

WATCH A BUCYRUS-ERIE AT WORK! Your distributor will gladly arrange the demonstration at your convenience. See him for full details, or write Bucyrus-Erie Company, South Milwaukee, Wisconsin, Dept. 34EA.

BUCYRUS ERIE®

BUILDS BETTER EQUIPMENT

a brand new 5 year old!

Here are just a few of the many features that put this new C-6 "Euc" years ahead of competitive crawlers:

Proven Torqmatic Drive . . . performance tested and proved in thousands of Euclid earth-movers on the toughest jobs.

Full Power Shift . . . no master clutch . . . easy operation and "fast as a fox" maneuverability that cuts work cycle time.

Fast, Positive Response . . . common steering and braking control, plus Torqmatic Drive for smooth operation on all tractor work.

Better Track Alignment . . . track roller frames are pivot mounted ahead of final drives . . . advanced design of front equalizer bar maintains positive alignment.

Low Maintenance Costs . . . easy accessibility of major components . . . no adjustment of steering clutches and brakes required . . . fewer lube points . . . dry type air cleaner . . . 7 track rollers . . . no tractor weight on final drives . . . recoil system eliminates mechanical springs.

No other Euclid product has ever had the thorough testing—both on proving grounds and on actual jobs—that the C-6 tractor has undergone during the last 5 years. All of the product refinements and improvements resulting from this exhaustive test program, plus Euclid's really new concept of crawler design, make C-6 performance a new standard for comparison in the 200 h.p. tractor class.

Have your Euclid dealer give you the facts and figures on the C-6 . . . compare performance as well as specs with any tractor in its class and you'll see what this new standard of tractor versatility can mean to you in better production and return on investment.

EUCLID Division of General Motors, Cleveland 17, Ohio

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

Excavating Engineer
founded 1905 DECEMBER 1959

Five Brothers Build Twin Cities Freeway

Minnesota construction firm reaches the big time after years of earthmoving experience, now building million-dollar-a-mile freeways as part of Minnesota's interstate highway network.

FIVE reasons are apparent for the success of the fastest growing highway construction company in the Upper Midwest—and all five are named Johnson. The family firm, founded in 1929 by Walter D. Johnson, spent many years mastering the earthmoving business on various highway, airport and dam projects, usually as a subcontractor. But now Johnson Construction Co., Grove City, Minn., has come of age and specializes in large "package" highway contracts which are bid in the seven figure bracket. The company, jointly owned by five brothers, has more than $10 million worth of work underway, most of it on interstate system freeways in the Minneapolis (Minn.) area.

Each member of the five man partnership contributes his particular talent, training and experience to the business venture, and the five comprise a well organized team of specialists.

Top billing in the brother act goes to Abe Johnson, general manager. A graduate of St. Paul's Hamline University, Abe has made himself an expert on matters of finance and corporate organization.

Ray Johnson, who studied engineering and business management at the University of Minnesota, specializes in choosing jobs and preparing the company's bids. Competitors point out that the Johnson firm's success can be attributed to the jobs it did *not* get as well as to the ones it did land. When Johnson Construction Co. was underbid, the job often turned out to be a loser for the contractor who got the work.

Serving as utility man and equipment maintenance specialist is George Johnson who mastered the mechanical end of the business through years of work in the family firm.

Material stockpiled for use as subbase is leveled by Allis-Chalmers HD-21 dozer.

Genial John R. Johnson, known to his men as "J. R.", serves as project manager and is currently directing a $1.2 million job on Minnesota state route 65 which is to become a principal feeder highway for traffic entering the Twin Cities freeway system from the north.

Project manager for three large jobs on Minneapolis' fast growing south side is young Bob Johnson, who studied civil engineering at Iowa State and graduated from the University of Minnesota. Under Bob's management are two adjacent I-system freeway segments and a nearby $400,000 bridge job.

The Twin Cities metropolitan area freeway system will include 160.6 miles of interstate routes built to the high, federal I-route specifications with Uncle Sam picking up 90% of the tab. In addition, other four-lane divided expressways, built to somewhat less rigid specifications, will supplement the urban I-routes. Completion of the freeway network is geared to the 13-year schedule of federal I-route construction. About 20 miles are under construction at present.

Highest priority was given to freeway segments in Minneapolis' booming southern suburbs of Richfield and Bloomington where Twin Cities motorists are getting their first taste of freeway driving on a 7-mile stretch of I-35. This main artery leading into Minneapolis from southern Minnestoa was completed in the spring of 1958 by Johnson Construction Co. working in joint venture with Barbarossa & Sons, Inc., of St. Cloud, Minn., and Nodland Construction Co., of Alexandria, Minn.

Johnson's present projects will become I-494, an east-west belt-line route on the southern perimeter of Minneapolis, which crosses the north-south I-35 route. This will be the first segment of I-route to be opened inside the metropolitan area when it is completed in 1960.

The four-lane divided highway was let as two separate jobs. The first section, stretching east from I-35 toward St. Paul, includes about 6½ miles of freeway. Johnson won the contract—the largest single contract ever let by the Minnesota highway department—on a bid of $6.8 million in October 1958. Last March Johnson was awarded a $2.4 million contract for about 2½ miles of the same highway extending west of I-35. Work on the two segments was immediately integrated and proceeded as a single unit under Project Manager Bob Johnson.

The whole nine-mile I-494 job calls for 3 million cubic yards of dirt excavation and 230,000 cubic yards of swamp excavation. The freeway will be depressed at grade separations but will rise close to the natural grade between these structures. After bridge and interchange embankments are in place, swamp cuts filled, entry and exit ramp embankments built and subbase laid, the job will yield about a half million cubic yards of surplus material. Material encountered in the general excavation is mostly sand and sandy loam free of rocks and boulders.

(Above) Caterpillar D9 push loads DW20 scraper in sandy cut area. Material is used to fill swamp cuts. (Below) Scraper fleet lines up for servicing during noon break.

Some 220,000 cubic yards of the surplus were stockpiled near the eastern end of the project for future use in approaches to a bridge scheduled to be built across the Minnesota River. Much of the remainder was sold to other contractors for jobs in the area. Material to be used as subbase was stockpiled near some major cut areas. Topsoil was also stripped and stockpiled along the right-of-way for later use in reseeding.

Equipment on the job when *Excavating Engineer* toured the area included three Caterpillar D8's, one D9, one D4, an Allis-Chalmers HD-21, and an HD-5. The scraper fleet was made up of DW20's and DW21's in varying numbers according to the needs of the various Johnson jobs. One Euclid TS-18

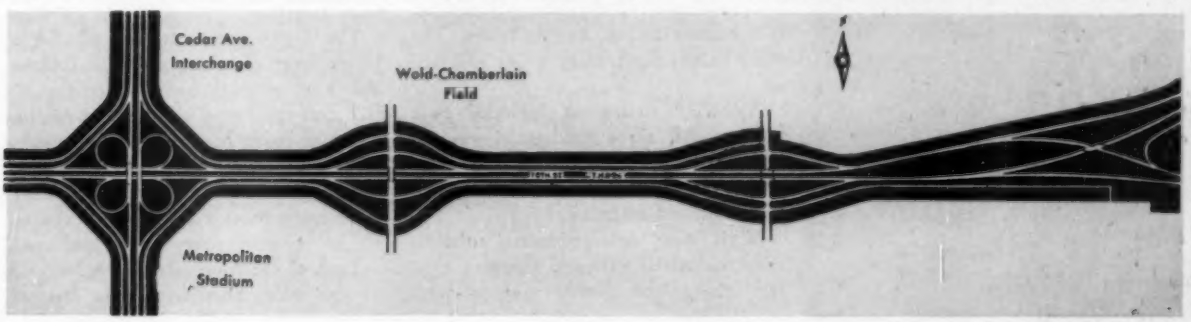
BOX SCORE

Twin Cities Freeway System

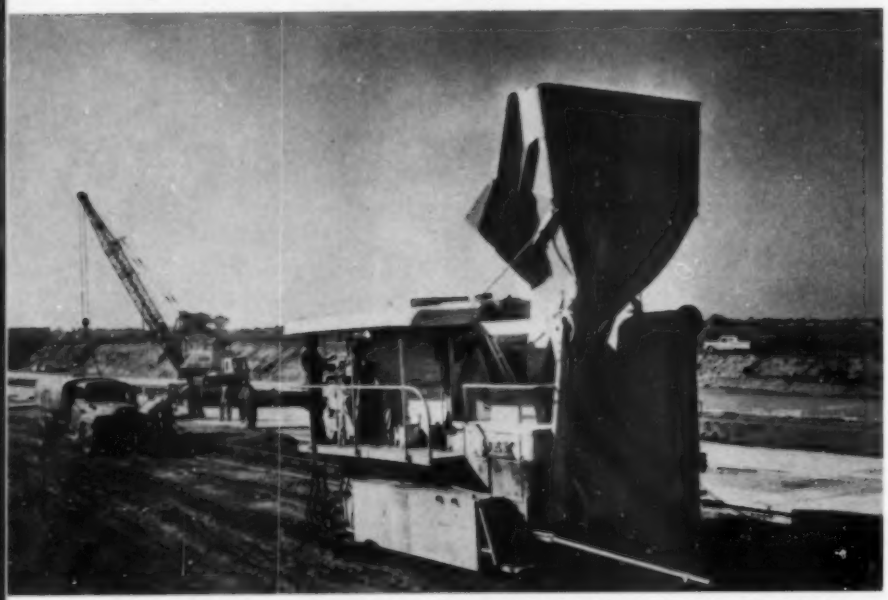
Completed	0.0 miles
Under Construction	19.3 "
Detailed Design Completed	6.8 "
Detailed Design Being Made	56.1 "
Preliminary Design Being Made	78.4 "
Total	160.6 miles

Routes	
I-35E	30.8 miles
I-35W	29.1 "
I-94	36.6 "
I-494	42.2 "
I-694	21.9 "
Total	160.6 miles

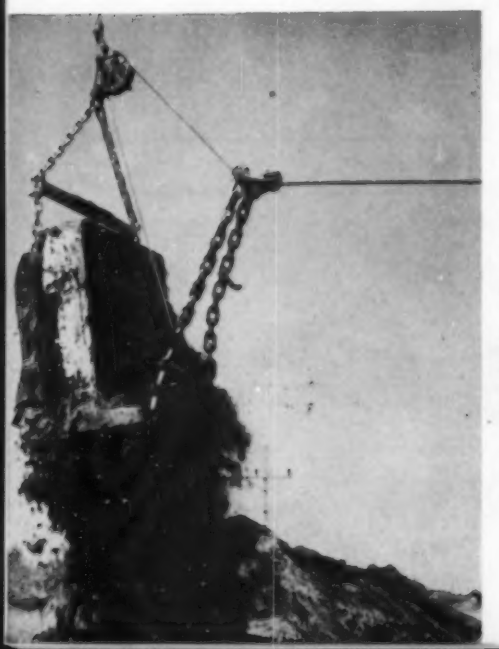
Map shows a portion of Minnesota's largest single highway job. Airport and new baseball park increase need for new freeway.



(Above) Topsoil is dumped by International R-170 and spread by D6 dozer. (Below) Barton paving spread includes Rex paver and 11-B handling reinforcing mesh.



(Below) B-E 5-yd. dragline bucket averages six yards per pass when 71-B starts new peat cut. Spoil piles are allowed to dry, then leveled with dozers or draglines.



scraper was shaping cloverleaf ramps. Two Tampo pneumatic rollers and four Vibro compactors were in operation. Also working on the final grading were five No. 12 Cat motor graders. Dump trucks included two 10-yd. tractor-trailer combinations and 18 straight jobs of various makes and models.

Making final cuts on slopes was a Bucyrus-Erie 71-B dragline with a 4-yd. B-E bucket on an 80-yd. boom. The machine was powered by a Cat 337 diesel.

Auxiliary equipment included four lube trucks, three mechanics' vans, a portable welder, a Universal rock crusher, a Michigan 175A front-end loader and a fuel truck.

With many new residential subdivisions, industrial sites and shopping centers along the 9-mile right-of-way, storm drainage installations are an important part of the I-494 job. A network of subdrains and interceptors will feed a main under the freeway that becomes an 84-in. diameter concrete drain for about two miles, and a 96-in. drain for the final mile. Storm drainage is conveyed 4,500 feet in an open concrete flume to an outfall at the Minnesota River. The flume, averaging about eight feet wide and six feet deep, is also part of Johnson's I-494 project.

This sewer work alone was worth about $2.5 million, more than one-fourth of the total contract, and much of it was sublet to Barbarossa & Sons, Inc. Trenches for the larger diameter drains were dug by Johnson with a 71-B dragline with a 4-yd. bucket and a 54-B with a 3-yd. bucket. Trenches for smaller drains were cut by Barbarossa with Link-Belt Speeder dragline and a ¾-yd. American.

Thirteen bridges are included in the I-494 contract. Four road crossings and one railroad bridge are steel beam structures; the other eight bridges are of prestressed concrete girder design. Dewatering was required in excavations for footings and subdrains on some of the bridges. A portion of the bridge work was subcontracted, but most was done by the Johnson firm.

Become Expert

Work in the "10,000 Lakes" state has made the Johnson company expert in the art of swamp excavation. Seven principal bogs were traversed or removed on the job. The largest was 40 feet deep. The 71-B and 54-B were assigned to the task of digging the muck while scrapers hauled in granular fill. Cut and fill operations had to be closely co-ordinated to prevent slides in the cut areas and mixing of the cut and fill materials. Sand was pushed into the cuts by Caterpillar D8 and D9 dozers in lifts of one to two feet in the lower reaches of the cuts, and lifts of 6 to 8 inches starting three feet below subgrade. Vibratory and pneumatic rollers compacted the fill to 90% Proctor density at optimum moisture.

The I-494 specifications call for a 12-in. layer of select granular subbase and 3-in. gravel base under the 10 inches of reinforced concrete pavement. Frontage roads must have a 6-in. subbase on 12 inches of compacted granular material, a 4-in. gravel base, 2-in. bituminous base, 1½-in. binder course, 1½-in. wearing course and a seal coat.

Each of the four separate roadways is 24 feet wide. Shoulders of the freeway

Cat D8 dozes granular fill into bog cut as 54-B dragline lifts out 3-yd. scoops of peat. Cut and fill operations must be closely coordinated to prevent mixing of materials.

roadways will be 10 feet on the outside and 4 feet on the inside. Paving on the I-494 project was subcontracted to Barton Contracting Co., Osseo, Minn.

When the depressed freeway is completed, the whole four lane divided highway will be opened at once while the contractor's efforts are devoted to getting the frontage roads in final shape.

The I-494 freeway was almost 75% complete when *Excavating Engineer* visited the project. Most of the major earthmoving machinery had been dispatched to the opposite side of the metropolitan area for duty on the highway 65 job. Project Manager J. R. Johnson described work there as "a simple earthmoving job."

Another two-lane roadway was being built to make four-lane divided highway of highway 65 for about six miles. About two miles of four-lane divided is also to be constructed by Johnson. Earthmoving was underway with a Caterpillar scraper fleet that included four DW21's and seven DW20's being push-loaded by D9's. The 1,100,000 cubic yards of dirt work were in a high quality sand material which was being used not only for fill and subbase, but also for a 6-in. stabilized base course under the black top pavement. In addition, 242,000 cubic yards of borrow was being hauled from a pit located less than 600 feet off the right-of-way. Hauls averaged 25 stations.

Deepest cuts on the highway 65 job were 20 feet. Longest hauls were completed early in the job when 65,000 cubic yards were moved three miles. Three No. 12 motor graders shaped the newly formed roadway.

The only obstacles in the "simple earthmoving job" were the inevitable swamps. Highway department engineers estimated 300,000 cubic yards of swamp work in some of the bogs where they sank test holes. In other bogs of unknown depth they estimated 3,800 2½-yd. dragline hours and 1,300 1-yd. dragline hours.

With the belief that bigger economies are possible with bigger machines, the Johnsons tackled the swamp excavation with a new Bucyrus-Erie 71-B dragline carrying a 5-yd. B-E bucket on a 90-ft. boom. The GM diesel-powered machine was moving 5,000 to 6,000 cubic yards on an average day and 7,000 yards on a good 10-hour day. When working above or near the water level, the 71-B averaged 6 yards per swing; when cuts were in deep water, the average fell.

Fill Hauled In

Cuts average about 10 feet in the bogs. Clean sand was hauled to the edge of the cut area by scrapers and dozed in by an Allis-Chalmers HD-21 and a rubber-tired Michigan 280. An embankment 10 feet over grade was being built to allow for settling.

Companion to the 71-B was a 54-B swinging a 3-yd. Hendrix perforated bucket on an 80-ft. boom. A Cat 337 diesel drove the 54-B. A third dragline, a 22-B, cut drainage ditches.

Spoil piles in the swampy areas are allowed to dry out, then are levelled with dozers.

The highway 65 job, begun in midsummer, was about one-fourth complete when *Excavating Engineer* saw the work. Despite ten days lost because of rain, the job was on schedule. The working day consisted of two 9-hour shifts that changed at noon—another Johnson innovation. "J. R." found that with one crew working from 2:30 a.m. to 12 noon, and the other from 1 p.m. to 10:30 p.m., both groups had a few hours under the lights, and most of their work in daylight. He reported that the men liked the arrangement better than alternating between two weeks of day work and two weeks of nights. And production increased under the setup. Noon hours were devoted to servicing the major machines.

Paving Scheduled

Plans for highway 65 call for 1,011,420 gallons of bituminous material to stabilize a 6-in. thick and 48-ft. wide base course. A hot-mix pavement 24 feet wide is to be laid late in 1960.

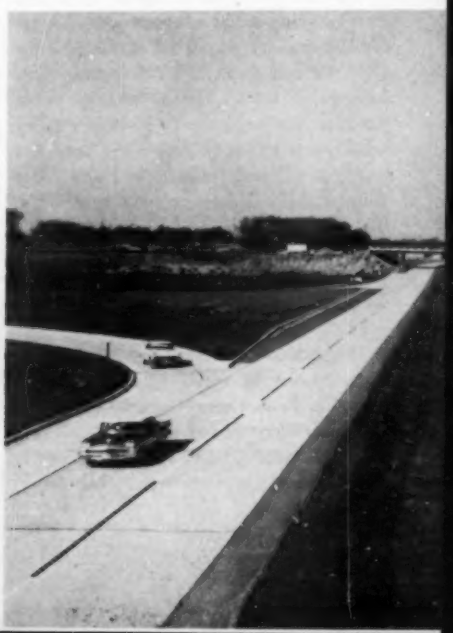
Originally eight brothers and their father, Walter D. Johnson, were partners in the firm. The elder Johnson and three of his sons, Jim, Paul and Walter Jr. are dead.

The five remaining Johnson brothers have applied themselves to building a strong company with a reputation for good work. And they have succeeded in winning the respect of state highway

Link Belt Speeder LS-98 lowers in a 2½-ton elbow section of 72-in. storm drain lateral on I-494. Subcontractor on job is Barbarossa & Son, Inc. of St. Cloud.

(Above) No. 12 grader works interchange ramp near new ball park. (Below) Moretrench well points dewater cut as Barbarossa crew installs a 10-in. metal subdrain.

(Below) Final cuts on freeway slope are made by 71-B dropping material into International dump truck. Dragline, powered by Cat 337 diesel engine, has an 80-ft. boom.



'Know-How' Cited

MEN, machines, money. These are the three essential ingredients of a successful construction enterprise. But more important than gathering the ingredients is knowing how to mix them. Abe Johnson, general manager of Johnson Construction Co., thinks that his firm has learned how, and that this explains the success of the rapidly growing company which he heads together with his four brothers.

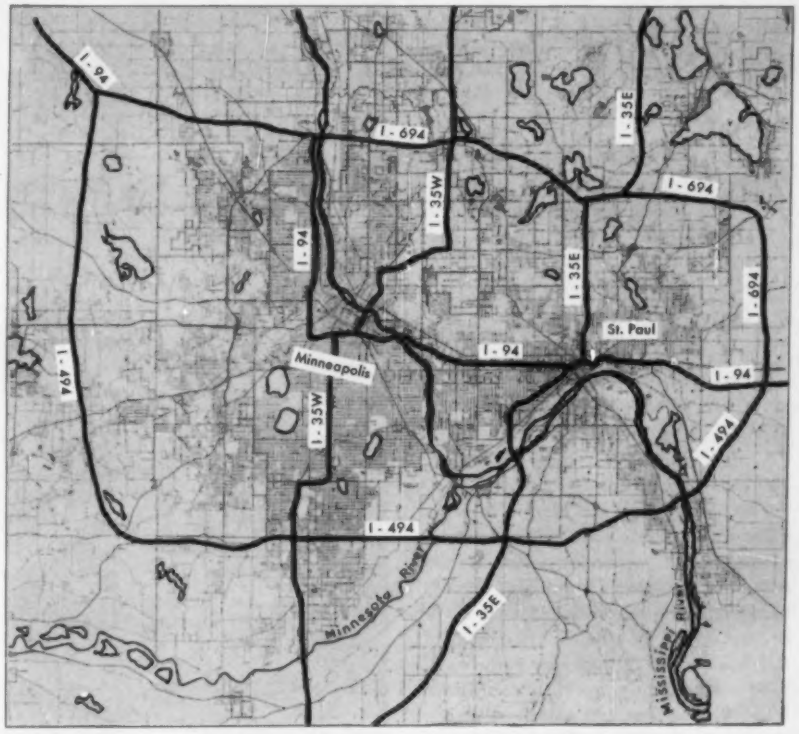
Evidently the Johnsons are right. Their men stick with the company through the season and report back the following spring. Rate of turnover is unusually low for the construction field. Many top supervisory personnel are veterans of the company's modest beginnings in the 30's. "Employees are as important as owners," Abe Johnson asserts.

"Machines must be chosen to suit the job," he declares. But when there is a choice of many possible machines, the Johnsons use the biggest that can economically be applied to the task. They found that the bigger machines yield bigger profit margins.

Johnson Construction's experience in the field and outstanding record for good workmanship has given the company a preferred-risk status with banks and bonding companies. So money, the third vital component, is available when needed.

Sound coordination of these three resources is the day-to-day story of the rapid growth of Johnson Construction Co.

(Right) Interstate routes will comprise Twin Cities 160.6-mile freeway system.



officials for whom they work, of the men who man their construction machines, and the respect of each other. Each of the brothers learned the business by working in it from the ground up. And, unlike many family enterprises, this partnership is not hampered by disharmony.

Turning point in the history of Johnson Construction Co. was reached in 1955 when the firm bid its first million dollar job, a highway project at Preston, Minn. Since that time about 90% of the company's work has been performed on contracts of $1 million or more. The following year the firm built a four-lane divided highway at Winona, Minn., and then Minnesota's first interstate route, a segment between Fairbault and Owatonna.

Company Climbs

By recognizing that they were ready for large "package" prime contracts by 1955, and by being able to coordinate the grading, paving and bridge erection portions of these jobs, the Johnsons have made the big climb to the top drawer of the construction business without a hitch.

Abe Johnson notes that the company learned the business from the ground up —excavation first, then structures, and finally paving. And, he hastens to add, the experience acquired along the way was invaluable.

Midwestern construction men acknowledge that the Johnsons have "arrived" in the field, but the firm is not standing still. It is undergoing an organizational streamlining to prepare for the larger things that lie ahead, especially the huge interstate highway network that is now only beginning.

Johnson Construction Co. is being phased out of existence. In its place, Johnson Bros. Highway and Heavy Constructors, Inc., is being created. The new corporation, with divisions for various types of construction work, will seek to preserve the unity that the five-man partnership established, and, at the same time, make room for the diversity of methods and machines that a "package" construction contract calls for. The single parent corporation is to provide a free flow of manpower and machinery to whatever operation can make best use of them.

This sort of arrangement, Abe Johnson points out, is dictated by the manner in which large package construction contracts are drawn.

The mainspring of the new organization will be the same one that provided the drive for the present company—a team of five energetic builders, all named Johnson.

(Below) Only freeway open in Twin Cities area is portion of I-35 completed last year by Johnson in a joint venture.

(Below) Three of the five brothers discuss safety on the I-494 job. From left are Project Manager Bob Johnson, Master Mechanic George, and General Manager Abe.

THIS PROJECT
HAS WORKED 169 DAYS
WITHOUT A LOST TIME ACCIDENT
THE LIFE YOU SAVE MAY BE YOUR OWN
JOHNSON CONSTRUCTION CO.
GROVE CITY, MINN.

Trinity's Underground Excavation

This is part three of a series concerning Trinity Dam project. An article about the big embankment appeared in the September issue. Last month's article featured the maintenance program of Trinity Dam Contractors.

by Ray Day

IMPORTANT. Tough. These two words describe Clear Creek Tunnel, which ranks high among the jobs heavy construction men have tackled in developing northern California. Clear Creek Tunnel is 10.8 miles long; it penetrates squeezing ground and other formations ranging through hard rock. Its waterlogged course, far beneath the mountains, has bled as much as 2,400 gallons per minute for hard-working pumps. To a tunnelman, water and squeezing ground are two of the most difficult problems a mining crew can face.

The difficulty of drilling and lining Clear Creek Tunnel was well recognized by the bidding contractors. The low bid was $36,600,000. It's a figure which exemplifies anticipated difficulties. Moreover, five of America's best-known construction firms pooled their resources, effort and risk factors in a joint-venture to do the job. These included The Shea Co. of Los Angeles; Kaiser Engineers of San Francisco; Morrison-Knudsen Co., Inc. of Boise, Idaho; the Raymond Concrete Pile Corp. of New York City; and Macco Corp. of Paramount, Calif. A vast storehouse of tunnel building know-how was represented in the five-firm combine.

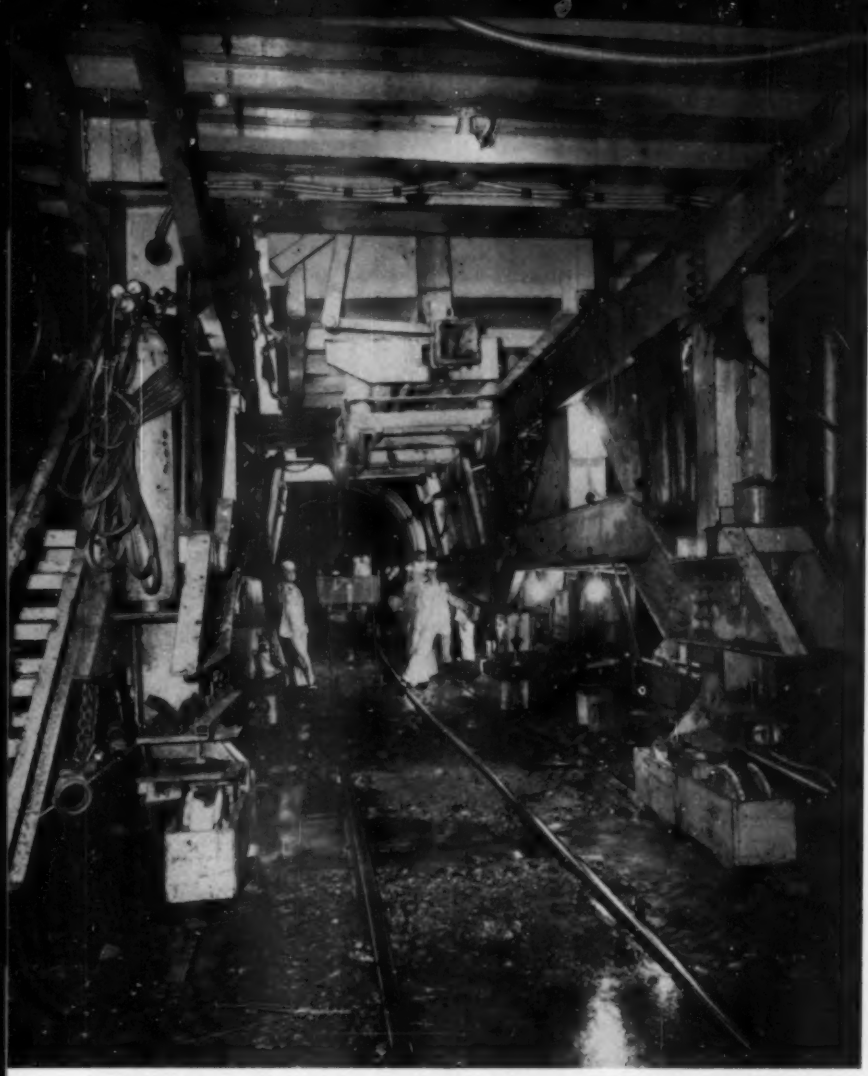
The tunnel will transport water from the regulating reservoir behind Lewiston Dam on the Trinity River, and transport it under the mountains to the Sacramento River watershed on the east side. Clear Creek Tunnel's outlet portal will drop the water, through a powerhouse, into Clear Creek, from which point it will make its way through a dam, another regulating structure and a shorter tunnel, eventually discharging the water into the reservoir behind Keswick Dam. From that point it will join Shasta Reservoir waters from the Sacramento River in a journey which eventually will take it as far south as Bakersfield in the lower San Joaquin Valley.

Major tunneling contract 11 miles long encounters heavy water and squeezing ground.

Four Headings

In setting up tunnel excavation, Shea-Kaiser-Morrison decided to use a four heading operations. One heading was located at the outlet portal, one was at the inlet portal, and a two-heading operation is being carried both ways from a 700-ft. adit at Crystal Creek. The Crystal Creek adit is approximately two miles from the outlet portal, in an area where muck disposal is fairly easy. There is room here, too, for setting up concrete-lining facilities and the extensive

Prior to bringing the jumbo drill rig into position, workmen lay rails at heading. Hole pattern is marked on the face.



Jumbo drill rig has one empty car on hoist during mucking operations. This empty car will be the next one loaded by the mucker when it is lowered in front of train of cars.

shops, air compressor stations and other things which are required in a modern tunnel operation.

Excavation began in June 1957. At the time this article was covered for *Excavating Engineer*, about 5,000 feet had been driven from the outlet portal, and 6,700 feet had been driven toward the outlet from the lower adit heading. The remaining 8.8 miles were being driven in approximately equal increments from the upper adit heading and the inlet portal heading.

Excavation at the outlet portal heading differs from the other three because it was strictly a rubber-tire show. The drill jumbo was a two-deck affair mounted on a Kenworth truck carrying two decks with lifter holes being drilled from underneath. Seven Gardner-Denver 93 drifters were mounted on conventional liners for drilling rounds ranging from six to twelve feet. Bethlehem Pacific Coast drill steel was used, along with Atlas Copco bits.

Rough drilling for the 17½-ft. finished diameter tube used a variable pattern of from 70 to 80 holes, which were loaded heavily with 40% gelatin powder. The powder business was divided up about equally between Hercules, Atlas and du Pont. Atlas Rockmaster delays were used in setting off the shots, and the finely broken muck was loaded by an Eimco 105 mucking machine to six Koehring Dumptors. All automotive units, including the diesel-powered Dumptors, were equipped with exhaust scrubbers so there would be no dangerous contamination of air inside the tunnel.

Just outside the discharge portal heading, a Chicago Pneumatic 600-cfm compressor and a Gardner-Denver 900 portable generated compressed air for the heading operation. A Joy Axi-Vane fan furnished fresh air to this heading.

Identical excavation methods were used at the two adit headings and the inlet portal heading. The adit was driven by the rubber-mounted vehicles for the first 900 feet, changing then to the permanent mining method when the rubber-mounted vehicles had passed the point of diminishing return from the standpoint of excavation cost.

Mount Drills

Each of these headings used a special drill jumbo, built by Moran Engineering Co., South Gate, Calif. These jumbos featured two decks with lifters being drilled below. On each jumbo seven Gardner-Denver D-93 drifters were mounted, with easy positioning possible by Gardner-Denver hydraulic jibs. Compressed air was supplied by five Ingersoll-Rand XLE compressors rated at 840 cfm at this elevation. Crucible Steel and Atlas Copco carbide insert bits were used throughout all three headings. Good footage has been made here, ranging up to a peak production of 70 feet per day at one heading.

After the 70-80 hole pattern is loaded

Closeup of the Conway mucker used by Shea-Kaiser-Morrison shows it starting its way underground on the inlet portal.

(Left) Powdermen load gelatin-type dynamite into a lifter hole at the tunnel face. (Right) Jib drills stand ready to sink holes.

with 40% powder and shot—delaying the shot from the center "V" cut toward the outside perimeter through lifter, arch, rib and reliever holes—Conway mucking machines take over and load the rock to Moran built 10-yd. side-dump cars. These side-dumps were built new for the job, feature a low center of gravity, ease of maintenance, and the ability to stay on the narrow-gauge railroad track at fairly high speed. The company pulled 8-ft. rounds successfully, on the average, and in a few cases lengthened out to as much as 12 and 16 feet. The long rounds, however, were not too good, chiefly because of the tricky nature of the ground and overbreak.

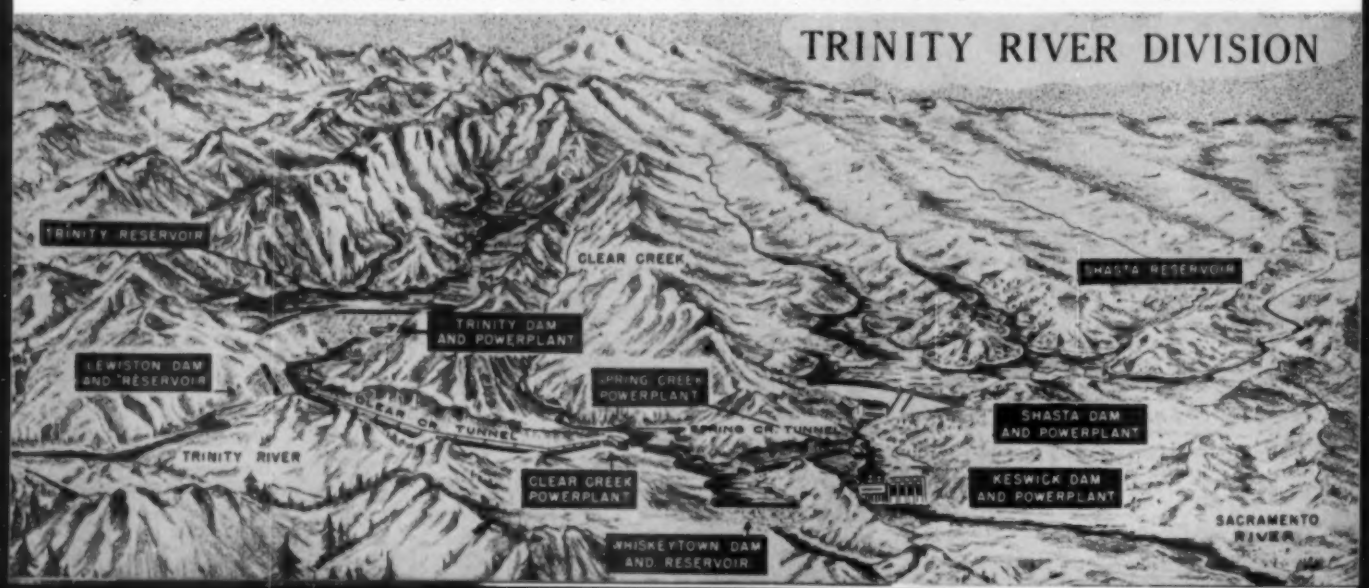
The two most serious problems, squeezing ground and underground water, have been real headaches throughout the excavation of Clear Creek Tunnel. Rock formations consist of rhyolite at the outlet portal, a gneiss contact zone through about 50% of the job, and quartz diorite changing to meta-andesite at the inlet end. Strangely enough, the quartz diorite was some of the best rock in the job; some of the gneiss contact zones made some of the toughest drilling.

Use Supports

Of all the project, only about 12,000 feet has been drilled unsupported. Some of the ground has squeezed so hard that 6-in., 20-lb. H-beams, placed nine inches on center for tunnel support, were squeezed and crumpled as the ground exerted its inexorable pressure. The contractors then changed steel sets to 8-in., 31-lb. H-sections, and succeeded in holding the ground pressure when these were placed on 1-ft. centers. When the job was still three miles from holing through, the quantity of steel reinforcement had already exceeded that set up by the U. S. Bureau of Reclamation in its specifications.

Great underground springs of water were also intercepted as the miners pushed the tunnel underneath the mountain. In places where the tunnel grade drained toward the adit or toward the

Map shows how the 11-mile long diversion tunnel project takes water under a mountain range to the Clear Creek power plant.



Gushing streams of water spill from drill holes, as crews pushing underneath the mountain intercept springs. Water is either pumped, or drained away by gravity.

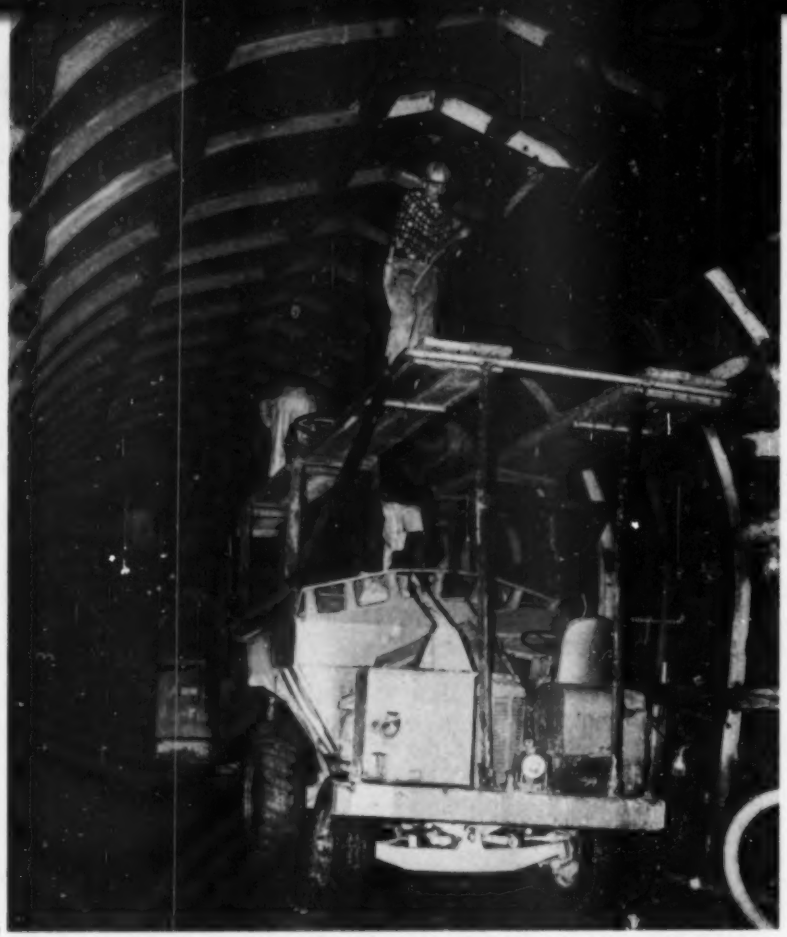
outlet portal, this was no particular problem beyond one of messiness. But it was a major problem at the downstream side of the inlet, where up to 2,400 gpm had to be pumped uphill. This was handled by two 8-in. Marlow pumps—one operating full time and the other as a standby—discharging into 20-in. lines. Where it was possible to drain the water away by gravity, this of course was done.

One of the nicest operations on the job from an excavating standpoint was the construction of a surge shaft 196 feet deep and 44 feet in diameter. The surge shaft, located near the inlet structure, is in meta-rhyolite rock fairly well decomposed. The shaft was excavated at the steady rate of four feet a day on a one-shift basis.

The job was done by using Atlas Copco stopers to drive a 6x10-ft. pilot shaft from the tunnel up through the top of the overburden. The bottom of this pilot shaft then was equipped with a metal chute and a gate for channeling muck into Koehring Dumptors. Excavation then came down full diameter, using jack-hammers to do the drilling and 40% gelatin dynamite to shake the rock loose. When a shot was made, a small Caterpillar D4 dozer was lowered in and shoved the broken muck over to the 6x10 pilot shaft. Koehring Dumptors then simply took their loads in turn, and hauled the material out to the rock dump.

One of the best concrete lining equipment installations ever seen in the tunneling business has been set up by the contractors, using basically new equipment specially purchased and designed to do a fast, good job. A total of 264 linear feet of Blaw-Knox steel forms has been purchased for the arch pours; the invert pours are being made for 70° of the circle by a special bridge with trench jacks, which hold it steady against the rock sides and away from the cleaned-up rock in the footing. Bureau of Reclamation specifications are very rigid regarding invert cleanup, so the contractors have used a small Caterpillar dozer for pushing most of the loose material to the Conway

Moran 10-yd. side-dump cars pulled by an electric locomotive haul rock over narrow gauge track to disposal sites.



This Koehring Dumpter was rigged especially for installing pipes for ventilation and discharge of water. A new section of pipe is being strapped to the tunnel roof.

mucker. Air and water jets then take over and clean up the foundation so perfectly that, to use the words of one official, "you could eat lunch on the thing." Concrete for the invert is being handled from Moran 6-yd. agitators over 230 feet of belt conveyor, which feeds the bridge operation just ahead of the tamping and leveling screed.

Outside equipment for concreting was all made by Noble in Oakland, and consists of a feeder trap to take aggregates and sand from delivery trucks, plus a conveyor which passes the material up to four bins equipped with feeder gates and Cleveland electric vibrators. Conveyors from these bins lead up to the top of the Noble batch plant where all aggregates are rescreened and sent to the mixer structure, where two Smith 1½-yd. turbine mixers are located. These two mixers have turned out as high as 80 cubic yards per hour, discharging to nine 6-yd. Moran built agitators. These agitators carry the material into the forms where a Pressweld gun pumps the concrete through a slick line, either to the invert or into the Blaw-Knox steel forms.

In cases where the material is placed in forms, the usual practice is to place the slick line to the far end of the forms and to hold it there until the pipe is embedded about five feet. Then the line is gradually retracted as the form is filled. Maximum size of aggregate in the concrete is 2½ inches, but in many sections reinforcing bars equivalent to two inches square of steel are being used, so 1½-in. maximum size aggregate is used there to work the material well around the steel.

Concrete Procedure

As a general rule, concreting starts at a far point from the batch plant and gradually works back toward the plant as tunnel mucking railroad tracks are picked up and the foundation cleaned. But the downstream heading from the adit has been worked in reverse, so to speak. Here, it was more economical to place the invert and work over the newly laid concrete. In concreting and in tunnel mining, California switches are used for making up trains of material and shunting empty cars into the work at hand.

The job is on schedule, and project officials expect it to be finished up by the scheduled completion date of November 1961.

For the contractor combine, the project is being administered by John Shea, project manager, with Edmund Shea, Jr. as his assistant. Glenn Meares is project engineer; Roger Williams, office manager; and Harry Greshuk, inlet superintendent. Mike Roych is in charge at the adit; Hank Ewert is concrete superintendent; Dan Baggs, outlet superintendent; and Jim Springer, electrical superintendent. Master mechanics include Jim Hedges at the intake, and Lee Garret in charge at the adit.

Supporting Contracts

NOBODY ever built a dam like Trinity without having the dozen or so supporting contracts these big projects require. Without the important supplementary construction which creates jobs for smaller contractors, reservoir sites wouldn't be cleared, utilities moved, or roads relocated.

While the work on these smaller contracts is often routine and always unsung, the small contractors face the same problems which plague the main contractor. They battle with rock and dirt and trees, and the rising costs of labor, materials and equipment.

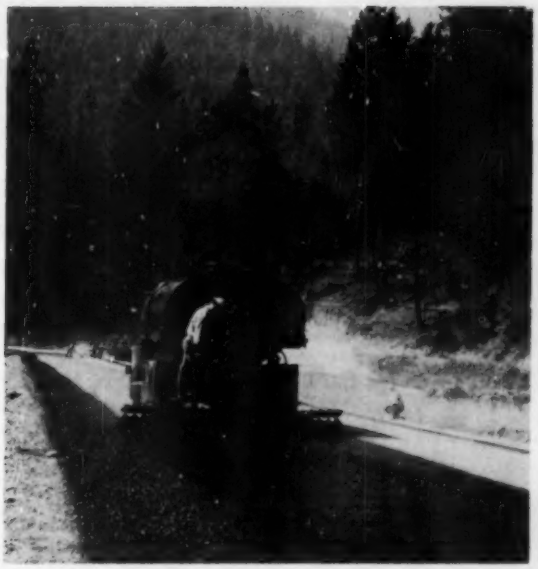
Right now several important supporting contracts of this type are under way. Reservoir clearing, which will turn Trinity Valley just above the dam from a green forest to red, denuded hillsides, is being pushed by three contractors. Union Construction Co. is clearing just above the dam, using the traditional spread of Cats, chain saws and labor crews. Mitchener & Hubner are above them, and J. H. Trisdale is above that.

Relocation of important county roads is also under way. O. K. Mittry Company has a 5.6-mile section from Rush Creek to Stoney Creek. Sierra Construction Co. takes up there and goes to Ridgeville. Kizer Construction Co., Portland, Ore., came in the picture by bidding low on the upper section above Sierra's job.

What these supporting contracts are like—the jobs they do and the equipment they use—can be seen in the series of pictures at right.

Forested lands along the river have become denuded hillsides through reservoir clearing. Trees have been removed up to the high water mark.

Beautiful new roads are a by-product of Trinity Dam. After this asphalt distributor finishes its work, rock chips are applied.



A Mack truck, working in the reservoir area, takes on a load of logs salvaged from a decking point by truck crane.

A pair of Cat motor graders work together blading subbase material into place on a realigned highway.

BEATS ALL COMPETITION

A COMPLETE, UNIT-DESIGN TRACTOR-SHOVEL INSTEAD OF A TRACTOR ATTACHMENT

If you excavate, dig or load materials, you owe it to yourself to make a thorough study of the model 12 "PAYLOADER". This 1¾ yd. crawler type shovel not only looks good, but has out-performed conventional tractor-shovels of its size . . . and even machines with 50% larger bucket capacities. There's nothing like the Model 12 on tracks.

Better Traction, Stability, Balance

Specifically designed for shovel jobs and not drawbar work, the Model 12 has the engine mounted in the rear. This factor alone makes a big difference . . . it counter-balances loading forces imposed during digging and the weight of the load in the bucket during travel . . . permits greater dumping reach with heaping loads without tipping forward. In shovel work, rear-engine design works *for you,* not against you. It spreads the weight of the machine and load over the entire track length instead of concentrating it on the front idlers. Result — more traction for digging, more stability for faster carry, smoother riding, less track maintenance . . . *plus* the ability to work in soft spots where other machines would bog down.

Power Steering Without Foot Brakes

Here is another operator's dream incorporated into the Model 12 — no heavy foot brakes to be pushed day-in and day-out. This "PAYLOADER" has two hydraulically-powered hand-steering levers, one for each track, that give the operator unexcelled maneuverability with finger-tip ease, enable him to make gradual or pivot turns as needed. The most modern non-stop, power-shift transmission provides low speeds for digging power as well as high forward and reverse travel speeds. There's no master clutch on the Model 12, no stopping for range shifts . . . all shifts, up or down, are made with only one finger-tip control lever, instantly, on the go. A heavy-duty torque converter automatically balances engine power to the load and provides an infinite number of travel speeds.

Loads trucks almost twice as fast

"It has cut truck-loading time nearly in half over our other tractor-loader," says Anthony Oliver, operator for Mohawk Constructors, Inc., Linden, N.J. "There is just nothing to compare with ease of operation and operator comfort offered by the Model 12. I also find the bucket control very accurate for grading work.

Backs out without spilling

Says Marvin Meier, operator for S. F. Renaud, Denver, Colo., "These Model 12's are the fastest basement diggers you can get. They dig easier and come out of the hole backwards or forwards without spilling. Besides, they are so easy to handle, you can't even find other equipment you can compare with them."

Outperformed two popular makes

"You can move forward or reverse with just a flick of the wrist. There's better visibility to cut basements and I can cut within an inch all the way around," says Eddie Campbell, contractor of Dyer, Indiana. Campbell dug 36 x 40 x 5 basements in 3½ hours, through 12 to 15 inches of frost. The Model 12 outperformed two other popular makes and was not only faster, but sturdier in his opinion.

Cuts basement digging time 1/3

"We first tried the Model 12 digging basements side by side with a ———— of equal size. The Model 12 finished its hole ½ quicker," says D. L. Johnson of Pearson Construction Company, Joliet, Ill. His operator, with 18 years tractor-shovel experience, says, "Its ease of operation, smoother ride and greater vision sold me. I can do the same work in 5 hours that it took me 8 before, and with half the effort."

Visibility... Comfort... Service Ease

The Model 12 operator is comfortably seated forward of the engine where nothing obstructs his vision. He can see what his bucket is doing and where he is going at all times. This central location gives him a smoother ride, because he is not subjected to the flipping action of the rear-seated position on conventional tractors. For fast, easy service and maintenance, the hydraulic boom arm control (no hoist needed) raises the rear superstructure of the Model 12 to provide easy access to steering clutches, lower chassis assembly, engine, transmission and other inspection points.

Get the complete story of the Model 12 "PAYLOADER", and why its many operating advantages make all other tractor-shovels obsolete. Its remarkable "built-in" traction, stability and balance is fully explained in an attractive 8-page bulletin that is yours for the asking.

HOUGH®

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THE FRANK G. HOUGH CO.
708 Sunnyside Ave., Libertyville, Ill.

Please send more data on the Model 12 "PAYLOADER"

Name _____

Title _____

Company _____

Street _____

City _____ State _____

10-C-1

Swamp-Going Draglines Spark Low-Cost Land Scheme

Up to their tracks in water, draglines work a dike-and-ditch plan to reclaim land from a Florida swamp. The world's largest Valencia orange grove will rise on 6,000 acres of "made" land.

by John C. Rehfield

ONLY a few minutes' drive inland from the movie set glamour of Florida's Gold Coast puts you in a world of waving sawgrass and endless marshland. Hardly a place you'd expect to find big equipment at work, this watery prairie. But a task force of construction men and machines works out there, writing the latest chapter in the story of the state's oldest industry.

In this submarginal swamp, long abandoned to hordes of insects and bright-colored fish, will rise a 6,000-acre orange grove. The new acreage will boost by almost 30% the Florida grove holdings of the Minute Maid Corp.

What's exciting about a few more acres of orange grove? Well, these acres are checking out the profits and pitfalls of a shrewd way to reclaim land. A way that might work just as well in the New Jersey meadows or the Missouri River flatlands. Let's call it dike-and-ditch.

Here's how it works. You throw a dike around the land to be reclaimed, sealing off the water inflow. Then you put in a grid of drainage ditches to carry away seepage and rainfall. Sumps collect this water for fast removal from the diked area by turbine pumps.

Cheap Method

Dike-and-ditch has several advantages over other "made" land methods. It's faster and cheaper than straight landfill. There's less dirt to move. No problems with special-duty machines, no long hauls. The finished area is made-to-order for cultivation. It has built-in irrigation ditches.

Besides proving out dike-and-ditch, this job gave draglines a chance to show they have what it takes for real wet digging. On this shakedown run, some bonus values cropped up, too. The draglines took crawler-deep water in stride —and chewed through matted jungle-like islands with equal ease. They turned

Looking strangely out of place in watery wasteland, a 1½-yd. dragline builds a dike that will surround the 6,000-acre orange grove. It piles up the muck 10 feet high.

Made-to-Order Land

RECLAIMING land is just a sideline with Minute Maid. But it's a logical outgrowth of the company's main line—freezing and canning citrus products.

In a way it's no exaggeration to say that the origins of the Holman R. Cloud Grove (named for the president of Minute Maid Groves Corp.) date back 10 years. That's when Minute Maid set out to insure a dependable supply of fruit for its processing plants. To do it they bought up the source of raw material—citrus groves. With a stake in the groves, the company gained control over its fruit from the blossom to the can.

Just owning land didn't insure a steady supply of fruit, however. The winter of 1957 proved that. Icy blasts jabbed deep into Florida's mid-section, stemmed the flow of useable fruit.

William J. Jones, foresighted manager of Minute Maid's groves, saw one way to beat Mother Nature at her own game. Just do like the tourists—look south. Plant trees in the sunshine zone where freezes rarely reach, and don't last long when they do.

As Jones puts it, "We had a choice. Fight the cold snaps in central Florida or the water down here. Nothing much we could do about the weather. But we feel the water can be controlled."

The swamp-going draglines casting up the dike near Fort Pierce are out to prove that Bill Jones knows what he's talking about.

Submarginal land is reclaimed by sealing off water inflow with miles of dikes.

in peak output shift after shift—at dirt-moving costs that ran only 25 cents a cubic yard for the dikes, 9 cents for ditches.

The statistics on this project impress even those people who expect everything in the Sunshine State to be labeled giant economy size. A dike 18 miles long will circle the grove like a modern Great Wall. Inside, some 60 miles of lateral ditches will drain the reclaimed land. Another 350 miles of service ditches will slice the grove like the stripes on a vast gridiron.

When the grove is finished the log-books will show 3 million cubic yards of dirt moved. To do the job, almost a half-million dollars' worth of new equipment—draglines, tractors, and motor graders—sweat out digging conditions tougher than any proving ground.

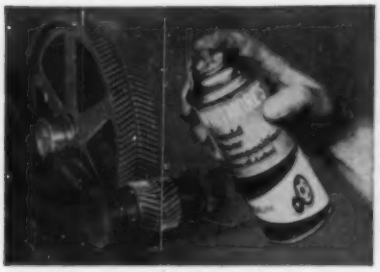
Already long islands of earth thrust

(Below) Taking time out from ditch digging, Link-Belt LS-68 builds a pump platform. Dozer has special Fleco tree guard to protect operator during clearing.

Earthmoving team shapes up planting bed between 6-ft. wide service ditches. Austin-Western grader and Cat D7 dozers level and crown the bed. A Couch 20,000-gpm turbine pump is part of a battery that will help control ground water level in grove.

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!



HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal —no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300% —special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
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- Roller, Ball, and Sleeve Bearings
- Speed Reducers

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THE WHITMORE MANUFACTURING CO.

LUBRICATING ENGINEERS

CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

above the clear water. By next spring neat rows of Valencia orange trees will line the islands. Five years from now the area will be as busy as the tourist centers at Fort Pierce, just 16 miles east. Only here the bustle will be one of industry—of men picking and boxing fine-quality fruit.

Today, only 30 men work at the grove site. They're on the job early, like construction stiffs the country over. The similarity ends there.

Take one of the shovel runners whose name is Henry Wrenn. Every morning Henry swings his Chevvy off the paved road at a new concrete bridge across a drainage canal. A sign reads, "private property," but it's still two miles to go to the job site. Two miles of sandy, bumpy access road.

Crew Assembles

Henry makes the two miles in three minutes. He parks his car in a lot behind the shiny Armco prefab building that doubles as a shop and job office. It's only 7:30, but most of the crew has assembled already.

The men climb aboard one of the two swamp buggies idling nearby. Henry calls them tall tractors, because of the gangly undercarriage that gives the Oliver OC-4 crawler about 5 feet ground clearance.

The men crowd the platform that brackets the buggy's engine as the rig moves along a haul road in the completed section of grove. The timber slats bolted to the track pads give a queer bumpty-bump motion that makes it tough to talk, so the men brace themselves against the hand rails and watch silently.

The haul road ends abruptly in a gently sloping ramp. Nothing out front but water and sawgrass as far as the eye can see. Shifting down a gear, the operator guides the buggy along the ramp and into the water. Moving along unseen paths, the rig pushes down the grass as it bulls its way forward. The operator works his steering clutches skilfully, changing direction at unseen checkpoints.

Henry's rig—a Bucyrus-Erie 38-B—is only about 1½ miles out from the office, but it takes almost a half hour to get there. Finally the swamp buggy rounds a clump of trees. There's the dragline, standing in the clear water like a strange mirage in a marine wasteland.

Henry and his oiler jump aboard the dragline and begin another day's work

Visitors pose on swamp buggy as it reaches dry land. Oliver OC-4 tractor, mounted on a high crawler undercarriage, is supply lifeline of the water-bound draglines.

as the swamp buggy roars off to the next rig.

Out here there are no distractions. No sidewalk superintendents except an occasional hawk that swoops low, grubbing for a handout. No excitement other than the sudden thunderstorms. For 10 hours a day, Henry swings his rig through a set ritual. Cast out the 1½-yd. Hendrix perforated bucket. Wind it in. Pull up the bucket, muddy water streaming from its portholes. Swing an easy quarter circle, dropping the mud on the toe of the long dike.

It's easy digging here. The soil is mostly silty clay under a mantle of about 15 inches of sand. A blanket of two to three feet of water covers everything.

The dragline moves 10 yards of material to build a linear foot of dike. The embankment rises 10 feet above water. It's 12 feet wide at the top, about 38 feet wide at its base. Borrow for the dike comes from outside the grove, to create a drainage ditch that will divert high water.

Henry sets a steady pace, pushing his 38-B just a bit because he knows the rest of the job waits on finish of the dike. Progress record: about a mile of dike a month. (To get part of the grove planted fast, temporary dikes are thrown around half sections—320 acres—of land as the main dike moves ahead.)

Cut Vegetation

Another 38-B on the job had to cut its way through islands overgrown with tropical jungle, as it pushed the dike straight along the section line. Here the drag really proved its mettle. It pioneered its own route, ripping out brush and trees, casting the debris aside, building up dike with the good soil underneath.

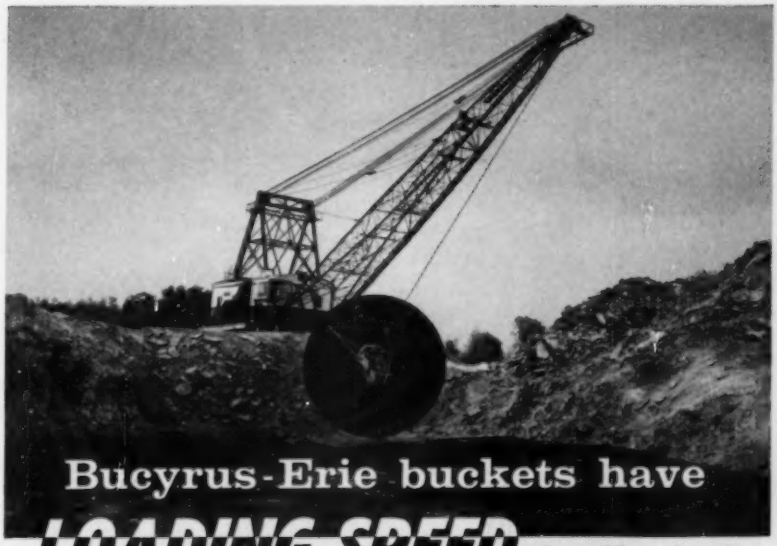
Compaction on the dike? Not needed. The silty clay beds down solid as the water drains from it. After drying for a week or so, the dike is solid enough to take a truck's weight.

Ditch digging inside the diked sections is a chore for draglines too. Before the water has drained from the land, a couple of Link-Belt Speeder 98's wade in to open lateral ditches every half mile across the section. The 98's wield 1-yd. perforated dragline buckets.

The laterals are 24 feet wide and about seven feet deep. The draglines move 5 yards of dirt to cut a linear foot of ditch. They shape about 500 feet of ditch a day each.

Final phase of the drainage job is to

Continued on page 30



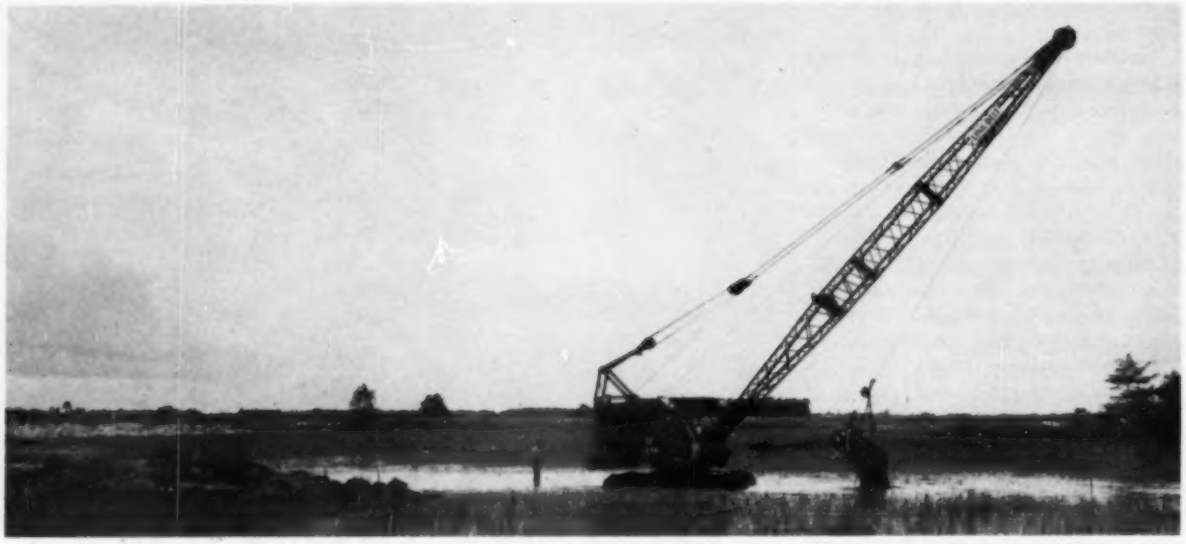
In high-speed Bucyrus-Erie buckets, weight is concentrated to help teeth, cutting edge, and thin "slicing action" lip penetrate swiftly. Material flows in easily because the bucket is tapered properly.

Bucyrus-Erie buckets swing smoothly through the carry without bobbing and spilling because they're properly flared and balanced. The high arch and smooth inside design assure clean, fast dumping.

For better bucket production, see your Bucyrus-Erie distributor or representative, or write Bucyrus-Erie Company, South Milwaukee, Wis., Dept. 4R.

BUCYRUS ERIE®

BUILDS BETTER EQUIPMENT



Working from a submerged timber mat, a Link-Belt LS-98 dragline starts to open up lateral drainage ditches.

Orange Grove . . .

Continued from page 29

open the 6-ft. wide grove ditches that connect the laterals. Two Link-Belt model 68 draglines put these in, 135 feet apart. There's a yard of dirt handled per linear foot of ditch, but the draglines still chalk up 1,200 feet a day.

When the land has dried out, dozers and motor graders move in to finish the job of bedding. That's grading and crowning the grove sections between ditches.

Three Caterpillar D7 dozers level off the material piled up by the draglines. Then three graders—two Cat No. 12's and an Austin-Western—shape the beds with a 21-in. crown for good drainage.

When the main dike is finished, the 38-B's will build a loop dike around 800 acres alongside the grove. This area will serve as a reservoir to store 14 acre-inches of fresh water for use in irrigating the groves during dry spells. A battery of turbine pumps with 300,000-gpm capacity will drain water from the grove into the reservoir in normal operation. When the water's needed for irrigation, the process will be reversed.

Memo to: Excavating Engineer
From: Your Roving Reporter

SOMETIMES—when the guys on the job remark what a sweet job this is, with the traveling, free-loading, and getting to see all those interesting projects—it's a pity to take pay for it. Other times—like the day *Excavating Engineer* visited the Minute Maid job—only a real crush on the business makes it worth while.

Camera Sticks

Things got off on the wrong foot right from the start. The gizmo that clicks off exposures on the trusty Rolleiflex got stuck. Trouble, sure. But after you've lived with a camera long enough, you know by Kentucky windage how much to crank it for each picture.

Time now passes—about three hours jiggling cross-country in a swamp buggy. Finally, back to the job office, just in time to beat one of those pitch-black tropical storms closing in.

Get the picture: Your reporter rushing for his car, dodging the first giant raindrops. In one hand, camera and exposure meter. In the other, gadget bag and notebook. In the teeth, keys for the car.

Unlock the trunk, quick, to stow away the camera and film in their case. Now it's really pouring. Slam the trunk lid shut and get into the car. Roll up the windows, and away we go. Well, almost.

Then the terrible sinking feeling. Where are the keys? Through each pocket three times. No keys. Finally the light dawns. They're in that self-locking Dodge trunk.

In a case like this, the ordinary man turns white and beats his head against the dashboard. It's the only sensible thing to do. The trunk is stronger than a bank vault, steel all around. The lock is jimmyproof.

How about the other set of keys? Safe at home, 200 miles away.

Secret Technique

To make a long story short, Foreman Cecil Wrenn came to the rescue. You've heard of crooks who stick a dime under the car's dash and start up in two seconds? Well, it took Cecil a bit longer—about 15 minutes and three short hunks of wire. But the car did start, finally.

So off we go, with Cecil's farewell ringing out. "Don't let the engine stall. Someone else might be suspicious about those crossed wires under the hood."

Allis-Chalmers Demonstrates Fuel Cell Tractor

A mixture of fuel gases, chiefly propane and oxygen, react within 1,008 fuel cells to provide the electricity that powers this experimental Allis-Chalmers D-12 tractor.

FIRST use of the fuel cell to power a vehicle was demonstrated by Allis-Chalmers Mfg. Co. in Milwaukee recently. A standard D-12 agricultural-type tractor powered by 1,008 of the cells pulled a double-bottom plow in a presentation witnessed by scores of newsmen, military officials and industry representatives. The fuel cell could someday replace gasoline and diesel engines in construction vehicles and equipment, A-C officials said.

The fuel cell, now being developed by several large companies, instantaneously converts chemical energy to electrical energy. The chemical energy in the Allis-Chalmers cell is provided by a mixture of fuel gases, chiefly propane and oxygen. The chemical action in the cell results in the release of a flow of electrons which become a direct current in an external circuit that links the cells together.

The fuel gases are activated in the cells by the anode electrode and a catalyst on the anode. Allis-Chalmers did not reveal what materials are used for these components. Unlike conventional batteries, the fuel cell cannot store electrical energy, but produces energy immediately as fuel is introduced into the cell.

Dr. H. K. Ihrig, director of research and an A-C vice-president, said, "Although our experimental fuel cell tractor is of commercial size, it is still a research vehicle."

Ihrig noted that the fuel cell was potentially 100% efficient compared with 40% efficiency of internal combustion engines.

"Fuel cells of the future may provide electric power for homes and factories, vehicles such as trucks and buses, tractors, farm and construction machines, or even be used in military weapons or space vehicles," he said.

The cells in the D-12 tractor were joined in 112 units of nine cells each. Each cell measured 12 inches by 12 inches and one-fourth inch thick. The current produced was fed into an Allis-Chalmers 20-hp DC motor. The tractor weighed 5,270 pounds and produced a tractive power measured at 3,000 pounds on a dynamometer.

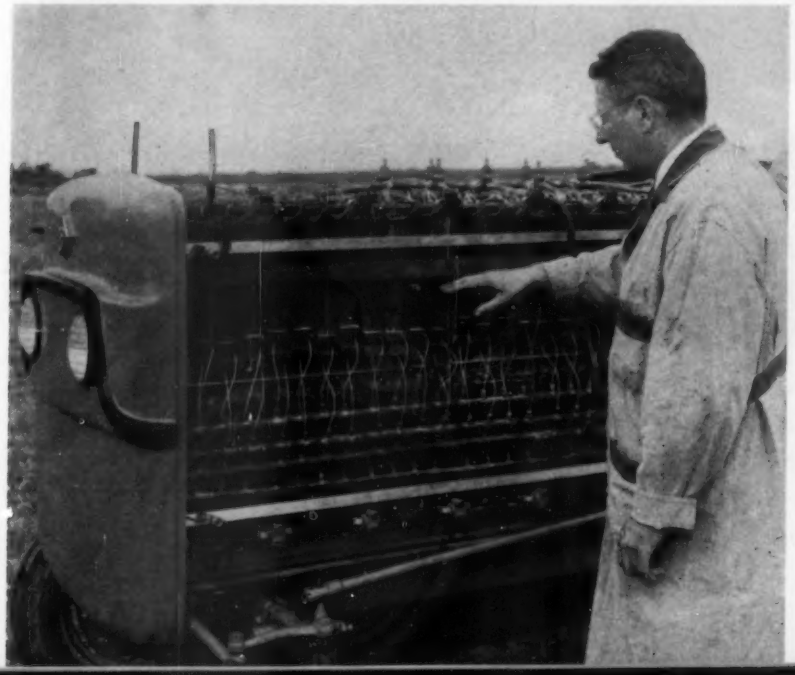
Current gathered from the cells is conducted by a bus bar to a standard controller, measuring 8 by 11 by 21 inches, that regulates the electricity delivered to the DC motor.

The tractor has no transmission. To reverse the tractor, the driver moves the second lever, changing the polarity of the current flow to the motor.

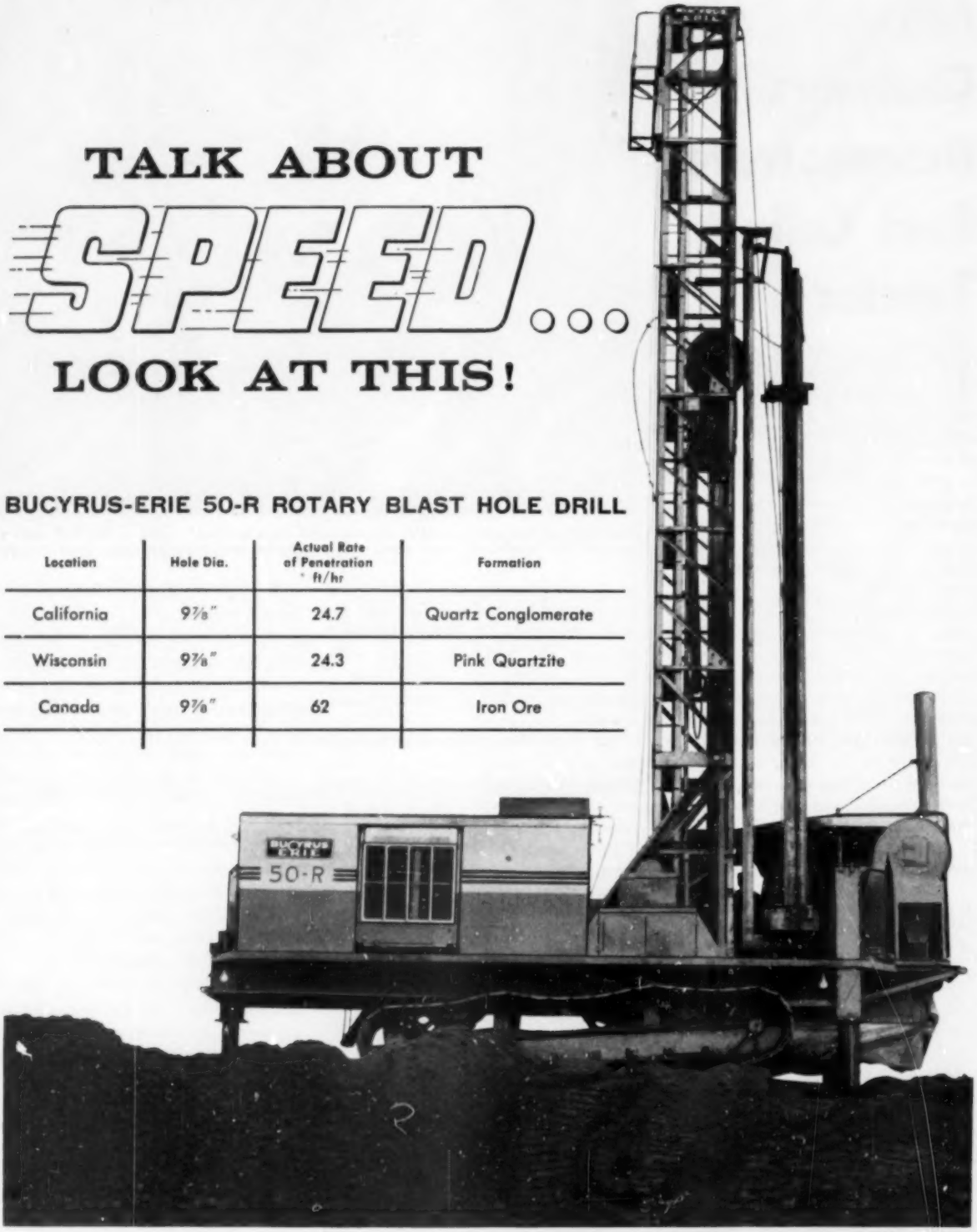
Allis-Chalmers' research division developed the prototype of the fuel cells used in the tractor. The company announced its first fuel cell a little more than a year ago.

A team of 20 engineers built the new versions of the cell and installed them in the modified D-12.

T. G. Kirkland, a member of the A-C team that developed the cells, shows how cells are arranged in 112 groups. Tubes feed gases in; horizontal bars pick up current.



TALK ABOUT SPEED... LOOK AT THIS!



BUCYRUS-ERIE 50-R ROTARY BLAST HOLE DRILL

Location	Hole Dia.	Actual Rate of Penetration ft/hr	Formation
California	9⅞"	24.7	Quartz Conglomerate
Wisconsin	9⅞"	24.3	Pink Quartzite
Canada	9⅞"	62	Iron Ore

These are typical production figures reported to us by owners of 50-R blast hole drills. We think they speak for themselves. No wonder it's the most wanted blast hole drill in the business.

Write for complete details. Bucyrus-Erie Company, Drill Division, Richmond, Indiana, Dept. 12BD.

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BUILDS BETTER EQUIPMENT

CATERPILLAR'S
PROGRESS REPORT
1959

NEVER before, in *one* year, has *one* manufacturer introduced a more impressive array of new heavy-duty earthmoving machines and major earthmoving developments than Caterpillar in 1959. All these new machines and developments, the dramatic result of Caterpillar's broad research and development program, have *one* common denominator: they pay off with faster, lower cost production than the earthmoving field has ever seen. They help you compete successfully in the most competitive construction market in history.

On the following pages you'll see all these machines and some of the developments. For the complete picture, see your Caterpillar dealer. Whatever your need, you'll find he has the *most productive* machine for it in his complete, modern, heavy-duty equipment line-up.

What about 1960? Caterpillar's multimillion-dollar research and development effort is a *continuing* program. That means you can count on *continuing* major equipment news from Caterpillar during the coming year. Keep your eye on Caterpillar in 1960!

Here they are— CATERPILLAR'S NEW

D9 Series E

Now the "King of the Crawlers" is better than ever with new capacity for higher, faster, lower-cost production on any big-tractor job. Here are some reasons why:

NEW UNDERCARRIAGE. Here's the "newest look" in this take-charge giant. Its undercarriage is more massive, more rugged than ever. And major improvements in all track components add hundreds of hours of life to running gear—hours that mean more time even on the toughest job.

STRONGER TRACK COMPONENTS. Bigger, heavier track links, shoes, pins and bushings give longer trouble-free service in roughest going. Increased link pitch from 9″ to 10¼″ means added size and strength in all track components. New deep hardening steel gives up to 40% longer life to shoes, links and rollers.

NEW 335 HP (flywheel)—268 HP (drawbar). More powerful than ever, the D9's Turbocharged Engine has the capacity to handle bigger loads faster, with even greater dependability and economy. A new, compact Turbocharger packs more air by weight into the engine and improves fuel-burning efficiency.

NEW EQUALIZER BAR. This important improvement in the D9 helps increase production, particularly on sidehill applications where the rocking action of the bar shifts more weight to the uphill track. Result: better tractor stability and increased operator confidence.

D8 Series H

Pacesetter in its tractor class, the new D8 Series H incorporates dramatic new engineering advances. Some are described here. For complete details, see your Caterpillar Dealer.

NEW POWER. The horsepower of the new D8 is up from 191 to 235 at the flywheel, from 155 to 185 at the drawbar. In addition, engine torque rise now is 20%, an increase of one-third. Over-all engine performance has been greatly improved by the addition of a Turbocharger.

NEW DIMENSIONS AND WEIGHT. The new D8 is heavier—it weighs 47,000 lb., over 2 tons more. It has 84″ track gauge, 5,505 square inches of track on the ground with standard 22″ track shoes. The new D8 has 19⅞″ ground clearance—50% more than ever before—and the most in its class.

NEW LIFETIME LUBRICATED ROLLERS AND IDLERS. Rollers and idlers are lubricated at the factory and will require no further lubrication until rebuilding. Special metal floating-ring seals keep lubricant in, dirt out, for lifetime lubrication. Proved by over 5 years of testing.

NEW DRY-TYPE AIR CLEANER. Most efficient air cleaner ever developed. Removes at least 99.8% of all dirt from intake air during *every* service hour. Can be serviced in five minutes. Cuts maintenance time by as much as 75%. Efficient at all engine speeds and operating conditions.

CAT D7 SERIES D TRACTOR

Packed with more power and more features to deliver even more production at lower cost!

More productive ability and greater operating economy —that's the result of advances in the new D7 Series D to make it an even better investment than the efficient machine it replaced.

Here are some of the key features that put the new D7 way out front in its class. A new Turbocharged Caterpillar Diesel Engine develops 140 flywheel HP, 112 drawbar. Improved torque characteristics increase its lugging ability 80%. The D7 also features a new dry-type air cleaner, new lifetime lubricated rollers, new lubrication system for transmission, new stronger final drive gears and optional in-seat starting. With all these and other new advances, certain time-tested features have been retained. To mention one, there's the exclusive oil clutch, which delivers 2,000 hours of service without adjustment.

For day-in, day-out hard work, no other machine of comparable size can match the new D7 Series D. It is way out in front of all others in its class!

POWER SHIFT TRANSMISSION

for D8 and D9 Tractors

On-the-go shifts under full load in a split second. Changes speed, reverses direction with finger-tip control lever—and no clutching!

This rugged new transmission, with an exclusive new design, provides production highs never before possible with a track-type tractor. Here's why: 1. It combines for the *first* time the flexibility and anti-stall features of torque converter with the operating snap of direct drive. And because of its direct drive characteristics, it is more efficient than other power shift designs. 2. With one control lever and no clutching, it reverses direction . . . changes speed . . . smoothly . . . under full load . . . in a fraction of a second.

Power shift control is mounted to the operator's left. One selector lever (black knob) eliminates gearshift, forward-reverse and flywheel clutch levers. The safety lever (red knob) prevents accidental engagement. The selector lever moves in a "U" path to various positions. Shifting is so easy the operator just naturally gets more work out of the tractor even on the toughest jobs.

One ton of ruggedness, Cat power shift transmission stands up under the heaviest earthmoving duty. See it demonstrated on D8 and D9 Tractors.

SYNCHROTOUCH TRANSMISSION CONTROL

for DW20 and DW21 Tractors

An advanced new way to shift gears easier and faster. Operator simply dials desired gear for automatic, split-second, touch-and-go response!

This remarkable Caterpillar advance combines economical direct drive transmission with the easiest, fastest shifting possible. An optional arrangement for DW20 and DW21 Tractors, SynchroTouch Transmission Control permits effortless shifting of transmission gears by means of a gear selector placed near the operator's right hand.

To shift up or down, the operator simply moves a selector switch to the desired gear. In less than a second, it is engaged. The standard foot clutch is retained, but is used only when starting from a standstill.

Fully tested on the job, Caterpillar SynchroTouch Transmission Control gives you these important benefits:

1. Faster shifting—for faster cycles and more payloads per hour.
2. A big reduction in operator fatigue—for more daily production.
3. Economical direct drive transmission—uses standard DW20 and DW21 transmission and clutch components.
4. No special maintenance required.

See the DW20 and DW21 in action with this great new optional control!

CAT No. 933 SERIES F TRAXCAVATOR

New power, new capacity, more features and new ruggedness increase output as much as 22%!

From every standpoint, the new No. 933 Series F is a bigger producer than the Series E model. You can count on it for more work cycles per hour, more yards production per day, easier operation and greater profits per job.

The Series F has many new features. Here are just a few. It has a new 1⅛ cu. yd. bucket, longer bucket reach and greater digging depth. Its new 52 HP Cat Engine is shorter, more compact with new engine balancers for smoother operation. It provides new operator comfort with convenient grouping of easy-operating controls and instruments, ample leg room and new comfortable seat. Its new power train, with 4 forward speeds (1.51 to 5.48 MPH) and new 3.67 MPH reverse boost production. And the time-proved, dependable oil clutch is standard.

Match the No. 933 against anything in its size. You'll be convinced: here's the most excavator-loader for your money!

MACHINES AND DEVELOPMENTS IN '59!

CAT DW20 and DW21 SERIES G TRACTORS

Now 345 HP for faster cycles—plus new high-capacity LOWBOWL Scrapers for bigger loads!

New horsepower, new rimpull, new speeds, new scraper ratings and new stronger structures—that sums up the impressive list of improvements made in these big new Caterpillar rigs. Compared with the models replaced, the new 345 HP (max. output) four-wheel DW20 and two-wheel DW21 Series G Tractors deliver 12% higher rimpull. This increased rimpull provides up to 20% faster travel speeds under similar haul road conditions. Compared with previous models, the new LOWBOWL Scrapers (No. 456 and No. 470 Series B) have 8% greater capacity. Their new ratings: 19.5 cu. yd. struck; 27 cu. yd. heaped. Also, the new No. 482 Scraper for use with the DW20 has 24 cu. yd. struck capacity, 34 cu. yd. heaped.

To handle this increased HP and increased capacity, both tractors and scrapers have been improved in design and structure. The tractors, for example, have stronger final drive gears and improved transmission shifter forks. The scrapers have stronger bowls, draft frames and aprons. All these and other improvements result in better service life, less maintenance and cheaper dirt. Geared for today's highly competitive market, these high-capacity rigs meet your needs for moving more dirt at lower cost than ever!

The "ALL NEW" No. 619-No. 442 and the NEW SERIES F DW15-No. 428

Select the tractor-scraper most suitable for your normal working conditions—the two-wheel No. 619 or the four-wheel DW15!

The new No. 619-No. 442 shown here is the first two-wheel rig with advanced design and performance features for any job. Its Turbocharged Cat Engine provides 225 HP and high torque rise, ideal for lugging under load and fast acceleration. Its LOWBOWL Scraper handles 14 cu. yd. struck, 18 cu. yd. heaped. It has a 30.2 MPH operating speed, plus ground-hugging roadability never before found in a two-wheel tractor of comparable size. In every way, it is a versatile "all job" rig.

Design improvements assure greater productivity than ever in the well-known four-wheel DW15-No. 428. New strength has been added for increased service life in bevel gear and pinion, differential and front wheel spindles. Along with these and other advances, this new Series F unit retains features that made it top performer in its class. It provides 200 HP (max. output) and high torque rise. Its LOWBOWL Scraper handles 13 cu. yd. struck, 18 cu. yd. heaped. The DW15 is also a versatile unit. It can be unhitched from the No. 428 and used to haul other units, among them the Athey PR15 Rear Dump Trailer.

BIG No. 14 TURBOCHARGED MOTOR GRADER

Most versatile BIG grader ever developed for high capacity both on power and control applications!

The first and only Turbocharged motor grader, the No. 14 packs 150 HP. Operates at the highest practical working speeds with either a 12′ or 14′ moldboard. Weighs in the 30,000-lb. class. And with all this power, speed and heft, it has the extra strength to deliver the high availability for which Cat Motor Graders are famous.

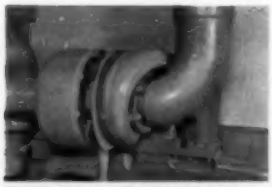
Big features include ample throat clearance between moldboard and circle for greater loads; the exclusive Cat-built oil clutch for longer life; the new dry-type air cleaner for greater efficiency; and big 14:00-24 tubeless tires all around.

You can put this versatile unit to work *profitably* on many different applications, such as:

—power applications like heavy grading, heavy ditching, rough grading and bank sloping.

—control applications like light spreading, surface maintenance, fine grading and light blading.

Because of this versatility, you don't have to pick "spots" for it. The No. 14 pays off in a big way on any big job. Name the date—your Caterpillar Dealer will demonstrate!

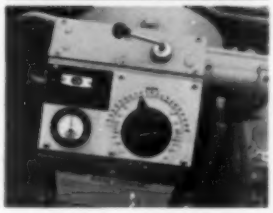


Turbocharged Engine

New 6-cylinder Turbocharged Cat-built Diesel develops 150 HP, with unequaled lugging ability — an 18% torque rise. Only motor grader in its class with "own make" engine. A dry-type air cleaner removes 99.8% of dirt from air during every service hour.

Heavy-Duty Circle & Moldboard

New design provides big load-carrying capacity. Circle and 12′ x 27″ x ⅞″ moldboard are the strongest in the big motor grader class. A 14′ moldboard is optional. Exclusive, new Cat mechanical blade controls provide precise, fast blade adjustment and positive hold.



Preco Automatic Blade Control

Optional on the No. 14. Another exclusive for Caterpillar Graders! Operator selects desired slope on dial. Transistorized for freedom from maintenance and adjustment, the unit automatically maintains blade slope within ⅛″ in 10′. The Preco control increases operator efficiency on a wide range of applications.

Caterpillar Tractor Co., General Offices, Peoria, Ill.; San Francisco, Calif., U.S.A.

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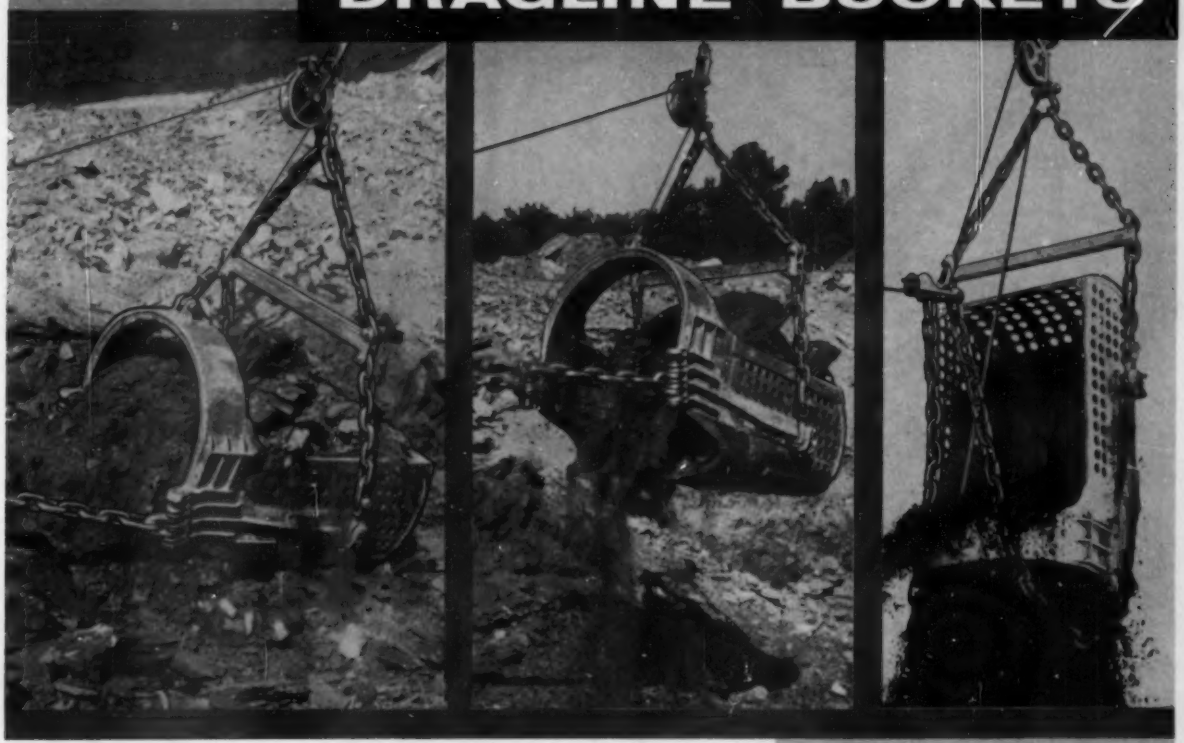

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Ex-Laffs *Hangs Up Both Stockings*

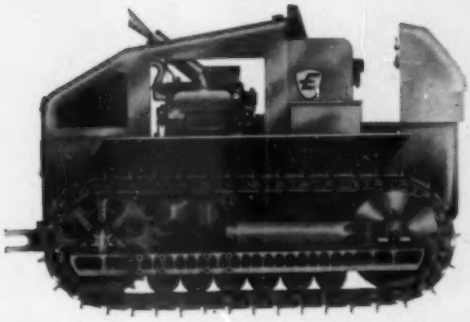
By Marion Townsend

"I DON'T CARE IF YOU ARE PLAYING SANTA CLAUS AT OUR COMPANY PARTY TONIGHT. JUST CARRY THE DIRT IN THE WHEELBARROW AS USUAL!"
"BUT I WANTED A TOY ONE."
Junior
"ALL THOSE IN FAVOR OF CHIPPING IN FIVE BUCKS FOR A GIFT FOR THE BOSS DROP DEAD!"
ICE
HA! HA! HO! HO!
EXCAVATING ENGINEER
"NOW LET'S HOPE WE DON'T NEED MORE PILING UNTIL AFTER CHRISTMAS."
"PERSONALLY, I'D RATHER HE JUST MAILED US OUR BONUS CHECK."

WE ASKED THE OWNERS AND OPERATORS,

"WHAT DO YOU WANT IN A BETTER TRACTOR?"

THEN WE ENGINEERED AND BUILT IT . . .



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You wanted maximum maneuverability in a medium size machine.

The Eimco 103 features independent track operation through Eimco's famous "Unidrive" and Dual Final Drives. True spin turns on its own length.

You wanted a choice of speed ranges.

Eimco engineered "Quadra-Torque", giving you a choice of four forward and four reverse speeds. You can shift from one to the other or from forward to reverse and back again at any tractor or engine speed by the flip of a lever, without slowing or stopping tractor. Gears never reverse rotation in Eimco's exclusive "Unidrive" transmission. Soundly engineered simplicity means less maintenance, longer life.

You wanted rugged construction, with minimum maintenance problems

Unitized "Stress Flow" Construction is the answer, another Eimco exclusive. No bolts; no welds. Large, strong steel castings are molded to shape and thickness required for new, greater strength and rigidity. Main frame, final drive and center housing on Eimco 103 are all in one strong casting, as is track roller frame and diagonal brake assembly, yet components are still readily accessible!

You wanted reliable, proven power plants.

The Eimco 103 is powered by 100 HP General Motors or Cummins Diesels of latest, modern design and efficiency, teamed with single stage heavy-duty torque converter, for full utilization of power.

You wanted sufficient ground-clearance.

The Eimco 103 has full 17" ground-clearance, over 40% more than the average.

For all the facts on additional features, write for specifications and comparative Fact Brochure, listing vital statistics of all leading makes of tractors and front end loaders.

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Lowphos Ore Hits Full Production

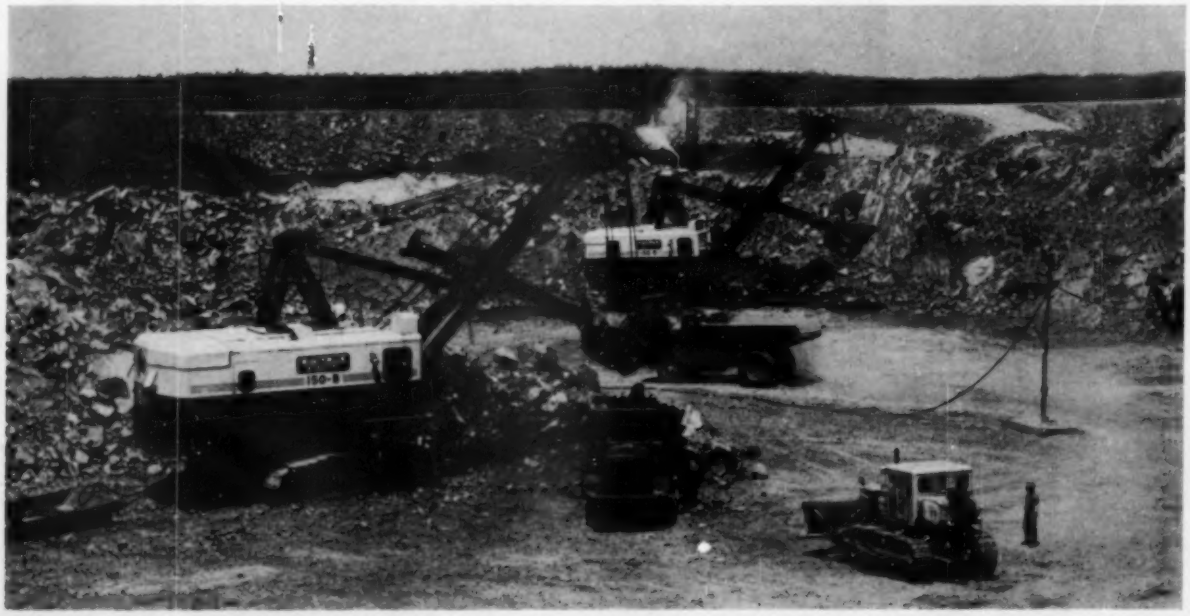
Round of 45 to 50 blast holes is sunk with 50-R rotary drill. The holes, loaded with a mixture of Hydromex and ammonium nitrate, provide 35,000 to 40,000 tons of crude.

Taconite—leanest and meanest of all iron ores—is processed by Hanna in Canada.

Reprinted from the Hanna Miner

MIX free enterprise with technological know-how and investment capital—lots of it—add a bit of favorable business climate, and you have the beginning of the recipe for the Moose Mountain mine and taconite plant, opened this year by Lowphos Ore Limited, a subsidiary of the M. A. Hanna Co., Hibbing, Minn.

The mine and 550,000-ton annual capacity plant are located some 15 miles north of Capreol, Ont. Mine stripping and construction of the concentrator, crusher, office and shop buildings were started in 1957, but because of economic conditions in the iron ore and steel industries last year, opening of the modern beneficiation installation and mine was delayed until this year. On April 2, the plant was started on a two shift basis and by April 16, the operation was going on a 20-shift a week schedule. Total employment will be about



Mine pit where two 6-yd. electric shovels load the magnetite ore into 22-ton bottom-dump trucks, looks much like a rock quarry.

(Above) A huge 300-hp electric motor provides the drive for the 66 x 84-in. jaw crusher—one of the world's largest. The unit reduces crude to minus 8-in. size.

160 men, and the mine and plant will operate year around. Plant buildings are all steel and have two layers of corrugated steel lined with fiber glass insulation.

There are 11 magnetite ore bodies at Moose Mountain. At present, ore body number two which is 5,000 feet in length, is being mined. Widths vary anywhere from 100 to 600 feet. In many instances, the ore, running in near vertical veins, outcrops and a great deal of it lies within a large hill, making open pit methods of mining ideal. Overburden, of course, is at a minimum.

The conventional drill, blast, shovel loading and truck hauling method of mining is employed at Moose Mountain. Blast holes are sunk with a 50-R rotary drill, and each round consists of about 45 or 50 holes. The holes are charged with a mixture of Hydromex and ammonium nitrate, and a single blast will produce approximately 35,000 to 40,000 tons of crude—enough to keep the plant going for about 10 days. At present, two 6-yd. shovels are loading into eight 22-ton trucks which deliver the crude to the primary crusher. The haul road is on a 7% grade and the distance from pit to crusher is 2,500 feet. The mine works on a one or two shifts a day basis, while the plant is on three shifts.

Unloading facilities at the primary crusher are available at either end of the structure. The crude is dumped directly onto a 78-in. apron feeder which carries it onto a 6-in. grizzly and then to a 66 x 84-in. jaw crusher. The jaw crusher at Moose Mountain is one of the largest of its kind in the world. Crude, reduced to minus eight inches, is discharged at the bottom of the crusher onto a 42-in. accelerator belt.

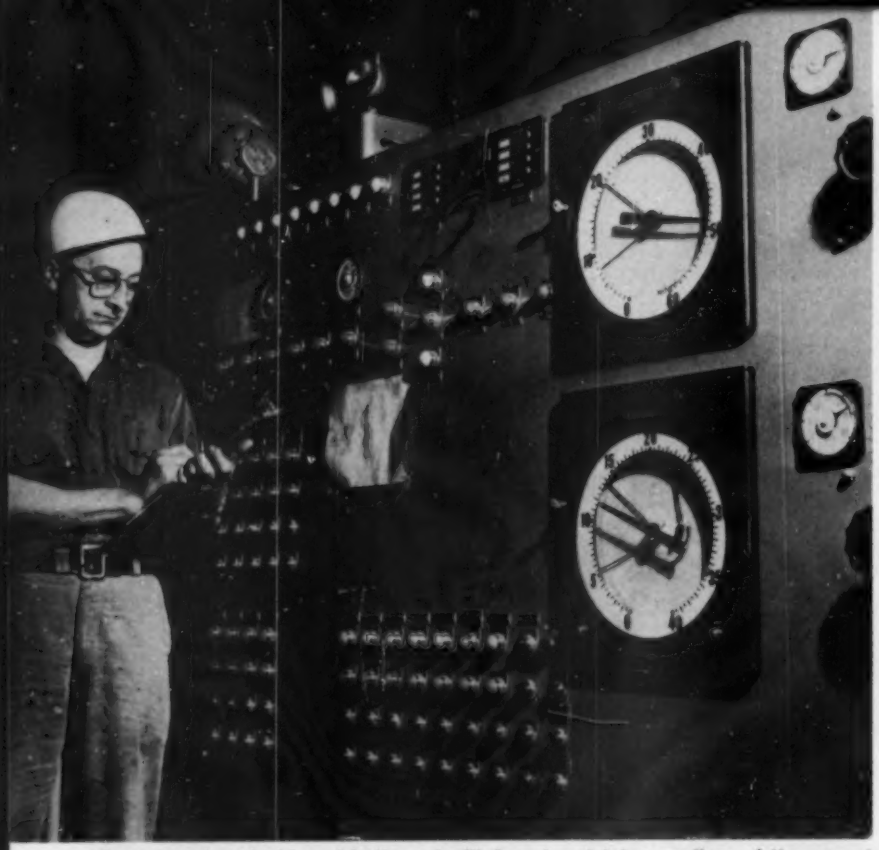
The crude is then transferred onto a 42-in. conveyor belt and carried to a

Hanna's pit foreman is Bill Burak. The mine and plant will operate year-round.

Crude is dumped into a 78-in. apron feeder which carries it onto a 6-in. grizzly and then to the giant primary crusher.

15 x 16 x 13-ft., 100-ton bin, located over the secondary crusher units. From the bin, the crude is dumped onto a 54 x 84-in. vibrating feeder and then to a 6 x 12-ft. screen. Material that is minus ⅝-in. goes by belt to a tripper station and is deposited into one of three storage silos at the concentrator building. Crude over ⅝-in. size is diverted into a 7-ft. cone secondary crusher, and then to the tertiary screens and crushers for the proper reduction before going to the storage silos. The Moose Mountain plant has three 3,450-ton capacity storage silos.

Final beneficiation begins when the crude, now sized to minus ⅝-in., is discharged from the storage silo onto a 24-in. belt. The material passes over a weightometer, which registers on a chart located at the rod mill control panel the amount of crude going into the plant. The crude also passes through an electronic sampler which gauges the amount of magnetic iron in the crude. The electronic sampler is called a Ramsey coil and the magnetic content is also



Operator at control board in the rod mill department takes readings of the amount of crude (top gauge) going into the plant, and magnetic iron (bottom) in the crude.

registered on a second chart at the rod mill control board. Generally speaking, one ton of concentrate will be produced from two tons of crude. As the crude enters the plant, iron content is about 25%. Beneficiation brings the iron to about 65%.

There are three production lines in the concentrator. Water is introduced into the beneficiation process at the beginning of the concentrator cycle and, until the product is filtered, it goes from one stage to the other in slurry form. As in most plants of this type, a tremendous amount of water is in circulation making it necessary to recover as much as possible. Recovery is done in the interest of conservation and economy. At Moose Mountain, about 10,000 gallons of water a minute are in circulation.

Magnetic Separation

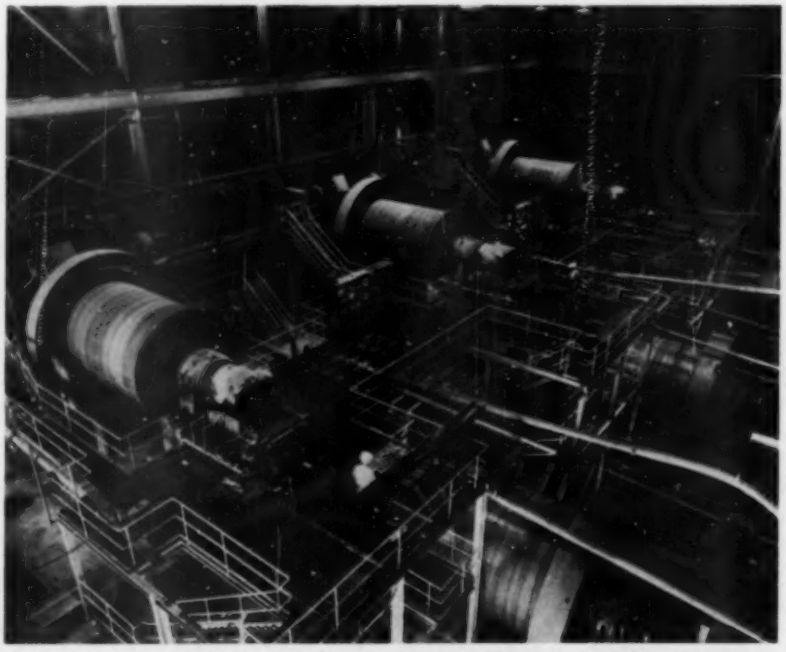
Crude passing over the weightometer and Ramsey coil is reduced to 10 mesh in a 9 x 12-ft. rod mill and is discharged onto three 4 x 6-ft. screens. The material, except for ¼-in. tramp, passes through a 36 x 48-in. cobber magnetic separator and then goes to a ball mill in closed circuit with two 36 x 72-in. rougher magnetic separators and a battery of 10-in. cyclones for separation of plus and minus 270 mesh. The ¼-in. screened oversize goes directly to the ball mill-separator-cyclone circuit.

After proper reduction has been completed, the product is put through a 26-ft. desliming hydroseparator before beginning the final magnetic separation. Crude passes through a three-way distributor and then to the 36 x 72-in. finishing magnetic separators.

After going through a 22-ft. thickener, the concentrate passes through a demagnetizing block, is filtered in a disc filter and carried by belt to the loading pocket. Concentrate can be loaded into trucks for stockpile or into railroad cars for shipment to Depot Harbour on Georgian Bay for ore carrier transportation to the lower lake ports.

Moose Mountain's fine-ground product will be used in at least two ways. First, as a richer sintered feed for the blast furnace, and second, as a "sweetener" for some of the other lower grade ores mined by Hanna in Michigan and in Minnesota.

For the steelmaker using the concentrate from this operation, it means getting more iron from existing capacity—in some cases, it could mean a production boost equal to an extra blast furnace for each five operating. This is important. Demand for steel increases each year but the rising cost of new capacity—just about doubled in 10 years—makes complete expansion prohibitive. A richer blast furnace diet is the alternative, and Moose Mountain's product at this point seems to fit the bill.



In the rod mills, crude is reduced to 10 mesh and then screened. Undersize material goes to cobber separator and then joins oversize at the ball-mill cyclone separator.

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ITEM	SIZE CU. YD.	DESCRIPTION	WT.	REG. PRICE	REDUCED PRICE
1	⅜	• DRAGLINE BUCKET, COMPLETE Type AX, Medium Duty S	950#	$ 710	$ 600
2	⅝	• DRAGLINE BUCKET, COMPLETE Type BL, Light Duty PS	1200#	865	700
3	⅞	• DRAGLINE BUCKET, COMPLETE Type BM, Medium Duty PS	1750#	1190	1000
4	⅞	• DRAGLINE BUCKET, COMPLETE Type BM, Medium Duty S	1750#	1190	900*
5	2	• DRAGLINE BUCKET, COMPLETE Type BL, Light Duty PS	3200#	2175	1900
6	2	• HENDRIX DRAGLINE BUCKET, COMPLETE Type TS, Medium Duty P	3550#		1500*
7	2½	• DRAGLINE BUCKET, COMPLETE Type BL, Light Duty PS	3850#	2600	2300
8	3	• DRAGLINE BUCKET, COMPLETE Type BL, Light Duty PS	4300#	2905	2500
9	3	• DRAGLINE BUCKET, COMPLETE Type BM, Medium Duty PS	4650#	3045	2350*
10	3¼	• DRAGLINE BUCKET, COMPLETE Type BM, Medium Duty S	5100#	3340	3000
11	3½	• DRAGLINE BUCKET, COMPLETE Type BM, Medium Duty S	5550#	3610	2730*
12	4	• DRAGLINE BUCKET, COMPLETE Type BL, Light Duty P	5400#	3620	3200
13	4½	• DRAGLINE BUCKET, COMPLETE Type BM, Medium Duty S	7650#	4970	4400
14	4½	• DRAGLINE BUCKET, COMPLETE Type BH, Heavy Duty S	8600#	5505	5000

*Used buckets. All others are new. P — Perforated S — Solid

- List prices F.O.B. Evansville, Indiana Works. Subject to regular cash discount 2%, 30 days from date of shipment.
- When ordering, give size of dragline and hoist line so that correct sizes of rope sockets can be included.
- Immediate shipment subject to prior sale.

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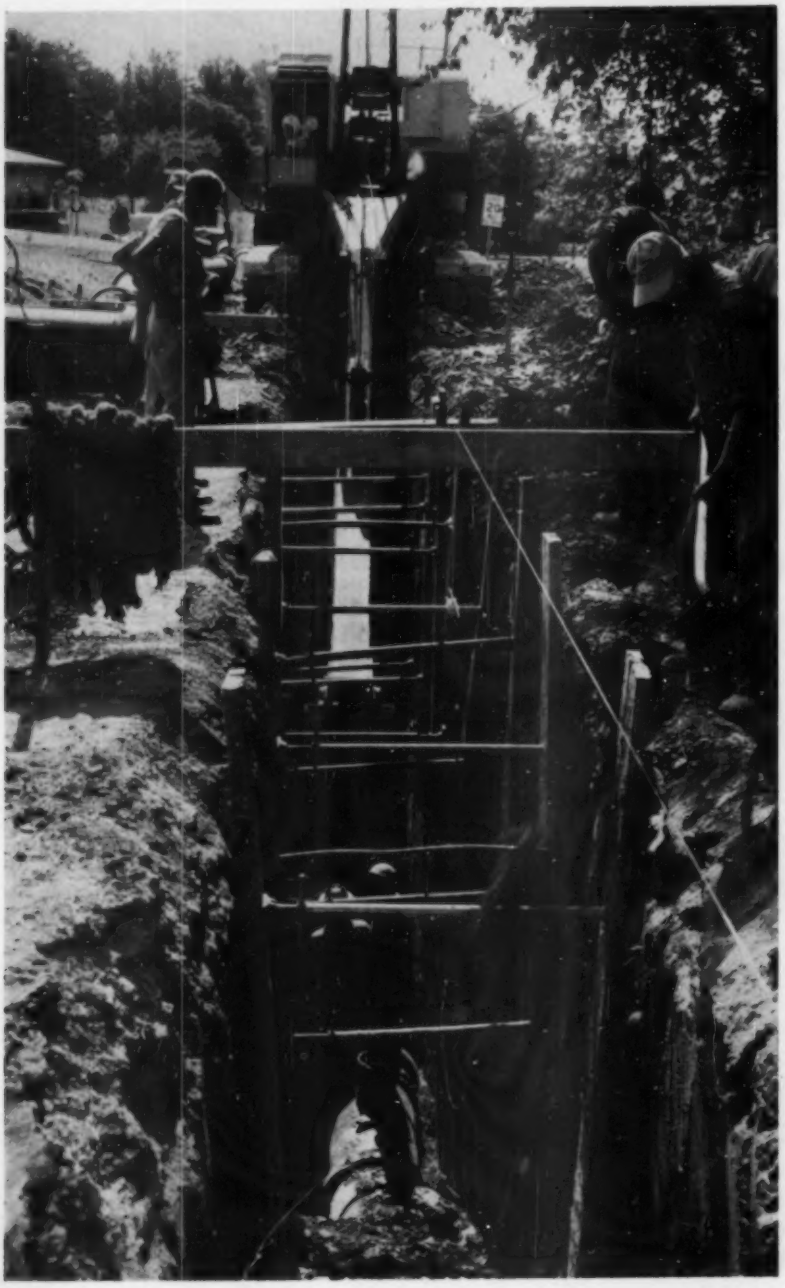
BUCYRUS-ERIE COMPANY • Parts Division • South Milwaukee, Wisconsin

Father-Son Team Become Sewer Experts

Handling of New Albany sewer job shows how Indiana firm of Mather Construction Co. is building a reputation for quality workmanship with efficient methods and experienced men.



by Syd Jamieson

WHEN sewer work is mentioned around southern Indiana, almost everyone thinks of the father-son team of Mather Construction, Inc., Clarksville, Ind. The combined talents of Charles Mather, Sr., and Charles Mather, Jr., have made the contracting firm an efficient, productive organization for this specialized field.

The Mathers have just completed two contracts totaling $800,000 as part of a $4.3 million sewer expansion program for the city of New Albany, Ind. They are presently working on a third. The big trunk and branch line project slated for completion this year, includes a $1.7 million sewerage disposal and incinerator plant. Consulting engineers for the project are Consoer, Townsend & Associates, Chicago, Ill.

The initial Mather contracts for the city of New Albany provided for 72,000 feet of vitrified, concrete and cast iron pipe, ranging in diameter from 8 inches to as much as 30 inches.

Work on the two contracts proceeded at the same time. It wasn't easy going . . . some 30 streams and creeks had to be crossed. Cleanup work was time consuming because sewers were laid through golf courses and a large city park. Rugged soapstone digging required new machine techniques. However, the Mather equipment spread brought the contracts through on schedule.

Speeds Crossings

Commenting on the problems faced crossing the many streams and creeks on the job, Mather said that the extra digging reach of the hoe compared to smaller machines speeded these crossings. Another innovation being considered by the Mather firm is the installation of a three-part drag and a large ripper tooth on the dipper to remove more efficiently the soapstone layers being encountered.

On the Binford Park location, Mather employed a Hough model HU Payloader with 1-yd. bucket for moving sand, gravel and other material from stockpile to backfill. The unit was also used for hauling of pipe and general cleanup work on the site. A 15-B with 45-ft. boom and ½-yd. clamshell laid pipe and worked wet areas as needed.

Backfill work was delegated to an International TD-14 bulldozer. Final cleanup operations were exact and time consuming because of the park and

Bucyrus-Erie 30-B hoe with 1¼-yd. dipper uses its long reach in deep sewer work.

Crushed stone blanket is laid in trench by Lorain MC 254 truck crane with ¾-yd. clamshell to provide firm base for pipe.

recreation areas. As a result, this became a team effort between machines and manual labor. The TD-14 was used to clear the heavier material. An Allis-Chalmers AD-3 motor grader and a small farm tractor pulling a drag teamed together to do the lighter cleanup work. Crews with hand tools gathered the small rocks and other minute material to finish the operation.

At Old Ford Road near Silver Creek southeast of New Albany, Mather constructed a double line sewer of 15-in. vitrified gravity and 10-in. cast iron pipe in the same trench. Depth of trench ranged from as little as 4 feet to as much as 25 feet. In this section workers encountered silt, giving a heavy amount of water seepage which produced voids in the trench wall near the bottom. This problem was solved by providing a base of crushed stone and installation of a cradle to firm-up the pipe. The double line sewer provided a 1-ft. layer of sand between the bottom line of cast iron pipe and the top line of vitrified clay. Working this contract were a Lorain MC 254 mobile crane with ¾-yd. clamshell, a 22-B with ¾-yd. hoe, an International TD-9 Drott Skid-Shovel, and a TD-14 bulldozer.

One section of the job called for 6,200 feet of sewer lines running through two golf courses. Size of pipe varied here from 24-in. concrete to 15 to 18-in. vitrified clay. In addition to soapstone, the Mathers had to work through clay, rock, limestone and slate. Workhorse on the job was a 30-B hoe

Doubling as a crane, the 30-B lowers a section of pipe into trench. Backfilling is done by 15-B clamshell in background.

(Above) When New Albany work encountered silt a 15-B was used to bail the trench. (Below) Note seepage and void in wall near trench bottom in this 25-ft. deep cut.

with 40-ft. reach from center pin to dipper. Using a 1¼-yd. dipper and changing from a three-line to a two-line anchor on the boom, the Mathers experienced a 35% increase in bucket speed coming out of the trench. Yardage performance was approximately 60 yards per hour and provided 200 to 225 feet per day of sewer laid at a 20-ft. depth.

When asked about this innovation, Charlie Mather, Sr., replied: "The machine takes the 1¼-yd. load amply for spoil and backfill, and there is no loss in time waiting for the dipper to raise once it has its load." Mather formerly employed a smaller hoe and accomplished only 75% of the present performance.

The Mather firm employs a well point system to lower the depth of ground water in sandy and other porous soils. This is done by sinking a pipe down through the soil to approximately a 21-ft. depth. Water is then drawn from the ground up through the pipe by an 8-in. pump. This technique is sufficient down to about an 18-ft. depth.

To keep abreast of trouble spots and in close touch with job foremen, the Mathers have recently installed two-way radios in all their trucks and station wagons.

The senior Charlie Mather was born in New Albany, Ind. Associated with the construction of sewage and water treatment plants most of his career,

Hough Payloader is used to string pipe and for general cleanup work on project.

Mather first served with the U. S. Army Corps of Engineers in the Louisville district from 1925-27. He was active in the construction of Ohio Lock No. 41 in that area. He later engaged in county, municipal and private engineering on sewers, buildings and heavy construction. For many years he was county engineer of Jackson County, Ind., and city engineer for Jeffersonville, Ind. Mather has also been associated with E. I. du-Pont de Nemours & Co., Inc. as division engineer for the Louisville area, and as a member of the engineering department of the Colgate Palmolive Co.

Son Joins Firm

His first successful bid as an independent contractor was for $250,000 on the Veteran's Hospital at Lexington, Ky. Since that initial bid, Charlie Mather, Sr., has completed $6 million worth of construction under the company name.

The junior Charles Mather attended Indiana University his freshman and sophomore years, and completed his education at the University of Louisville in 1949. During his college years, young Mather was actively contracting in the painting field. In 1950, the younger Mather became associated with his father.

The father-son team has worked together constantly since that time, establishing their own contracting company in 1952. During the past five years, the young Mather has been project manager on many company jobs.

(Above) Charlie Mather, Sr., talks to operators before day's work. (Below) Charlie, Jr. watches as TD-9 Drott Skid-Shovel brings crushed rock for trench bottom.

Instilled with the same competitive urge as his father, the younger Mather lends a good balance in determining bids on various jobs. Bids submitted by Mather Construction, Inc., are prepared jointly by father and son—seldom does either of the two submit a bid without the advice of the other.

Mather Construction, Inc. was incorporated January 1, this year, with its home office located at 1043 S. Clark Blvd., Clarksville, Ind. The company has a two-acre yard for equipment storage which also is the site of a modern repair shop. Since 1955, the Mathers have planned a very modern and new office building, but due to the press of business activities construction on the new quarters has been delayed.

Officers of the company are Charles Mather, Sr., president; Charles Mather, Jr., vice-president; Mrs. Charles R. Mather, Jr., secretary; and Mrs. Charles R. Mather, Sr., treasurer.

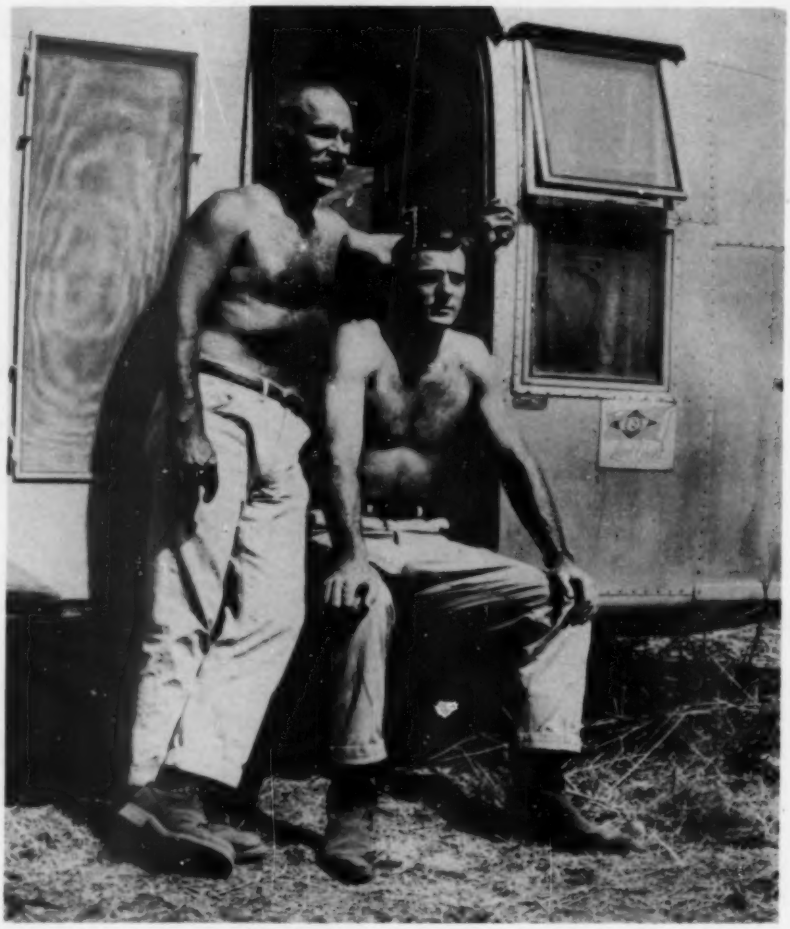
News from the Field

Construction Men Are Heroes Of New NBC TV Series

Comics, cowboys and cops have all had their day—now construction men are the newest heroes of the television tube. A new NBC series called *Troubleshooters* depicts the adventures and accomplishments of men who move mountains, build roads, dams and bridges all over the world. (Check your local newspaper for time and station.)

Starring in *Troubleshooters* are Keenan Wynn as a tough superintendent and Bob Mathias as a young engineer. Both believers in "realism," Wynn and Mathias learned to manipulate the tractors, power shovels, cranes, drills and rollers used in their construction adventures.

All members of the show cast try to avoid calling in stunt men to substitute for them, and they have become the hardest working group of actors seen on TV. Locations of overseas projects in Italy, Alaska or South America are all simulated in California's San Fernando valley, where the show's "Stenrud Construction Co." makes its home and office in an Airstream Land Yacht trailer.



Keenan Wynn (left), and Bob Mathias are the stars of a new TV series, *Troubleshooters*, that depicts the adventures of construction men tackling exciting projects.

Heavyweight champ Ingemar Johansson (right), is shown at Peoria (Ill.) plant with Oscar von Seegar (left), Cat European sales manager. Others in group are the champ's brother Rolfe, (second from left), and J. L. Sahlberg, Cat general foreman.

Heavyweight Champ Owns Contracting Firm

Most people know him as the world's heavyweight boxing champion. Relatively few, however, are aware that Ingemar Johansson is also a successful contractor based in Gothenburg, Sweden.

Ingo, as he is called, described his construction business recently when he visited Caterpillar Tractor Co., Peoria, Ill., to see plant facilities and new tractors.

The modest but self-assured man who knocked Floyd Patterson and the boxing world for a loop last June has been

Continued on page 54

These Special Excavating Jobs Are Best Handled by Sauerman DragScrapers

Deep Digging

900-FT. SPAN— 65 FT. BELOW WATER...

Load is deposited by tensioning the track cable, thus lifting the DragScraper from the pile. Tensioning continues to the desired height for releasing the DragScraper and returning it by gravity to the pit.

Operator controls digging and hauling from cab in head tower.

"the 10-yd. DragScraper is doing a wonderful job and we could not operate without it..."

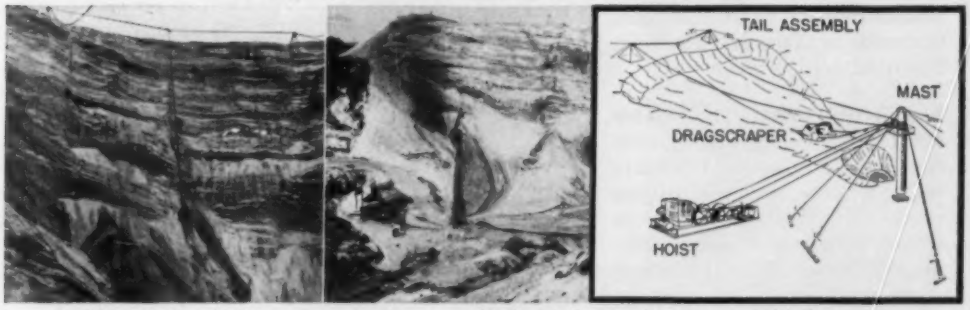
Louis Chinelli, Gen. Supt. Redman Concrete Corp.

Redman had been trucking material at a cost of $35,000 a year to the location where the DragScraper is now placing it. The 10-yd. Sauerman covers a pond area of 1500′ by 3000′ and is digging 40 ft. deeper than their previous dragline could operate.

The DragScraper digs and hauls on a 900-ft. span. It operates between a 90-ft. fixed head tower and a 40-ft. mobile tail tower which may be shifted to change the line of operation. The company's 1000-yd.-per-day batch plants and its fleet of mixers and trucks are kept busy by the steady flow of material supplied by the DragScraper.

High Bank Digging

175 FT. HIGH— 600-FT. HAUL...



DragScraper digs from high bank.

Overall view shows height and steepness of bank. Diagram shows details of Sauerman installation.

"I have nothing but praise for our 4-yd. Sauerman Machine. Since the DragScraper began operations in 1952, we have worked it continuously 12 hours a day..."

John D. Robertson, Gen. Supt. Chandler's Palos Verdes Sand & Gravel Co.

By working down from the top of the 175-ft. bank, the material flows ahead of the DragScraper. This provides bonus loads on each haul and substantially lessens the danger of cave-ins.

Operating cables are powered by a Sauerman three-drum electric hoist. Equipped for rapid shifting, the DragScraper can be quickly positioned to any line of operation between the two tail towers at the top of the bank and the headpost at the hopper.

The plant is the largest sand producer in the South Los Angeles area and, together with two ready-mix plants, keeps 22 ready-mix and 18 dump trucks busy.

The best Sauerman Machine for your plant is governed by the nature of the deposit, location of material, the depth and plant layout. Consult Sauerman engineers about your plant. Their recommendations will be based on fifty years of excavating machinery experience. Ask for Catalog A (DragScrapers). Sauerman News Nos. 149 and 150 describe the above installations in greater detail.

SAUERMAN BROS. INC. 622 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DUROLITE BLOCKS

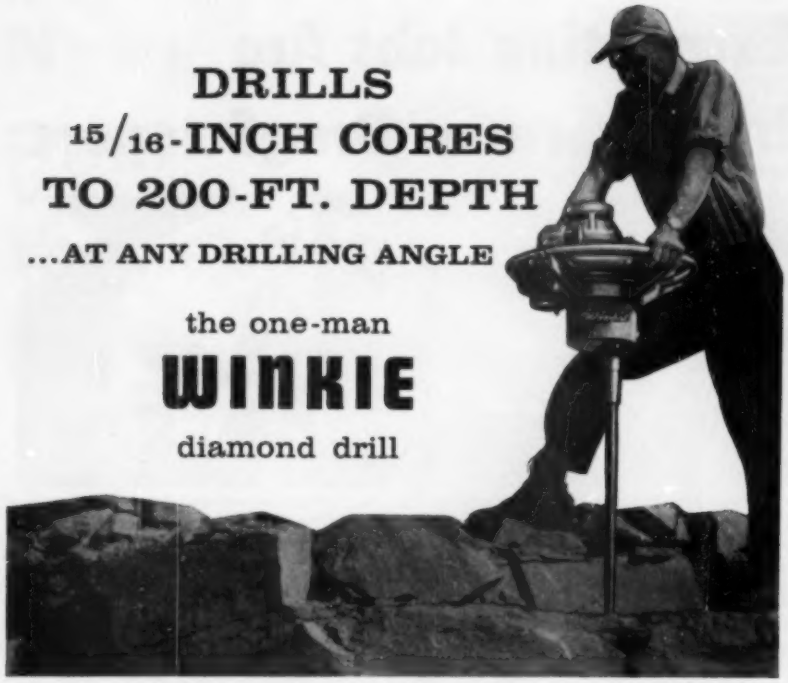
DRILLS 15/16-INCH CORES TO 200-FT. DEPTH

...AT ANY DRILLING ANGLE

the one-man

WINKIE

diamond drill



So powerful, yet so portable — The new Bucyrus-Erie Winkie diamond drill weighs only 45 pounds, yet even in granite, the Winkie recovers 15/16-inch cores to depths of 200 feet. Maximum core diameter is 8 inches.

Low initial cost — The Winkie sells for half the cost of drills with equal capacity — is not limited to single purpose or a few drilling chores. The Winkie will take on almost any core or structural drilling job, finish it faster . . . cheaper . . . easier.

Lowest operating cost — The Winkie's easy-starting, 2-cycle, 5¼-hp gasoline engine will operate at full throttle, full load on less than a gallon of fuel per hour.

Whatever your job, the Winkie will give you greater footage per shift — for less cost — than any drill of comparable capacity. Write Dept. 21B59, Bucyrus-Erie Company, Drill Division, Richmond, Indiana, for complete details on the amazing big-capacity, lightweight Winkie.

45 lb.
2-cycle, gasoline, air-cooled engine
5¼ hp @ 5000 rpm
Hardened helical transmission gears
Gravity and hand lever feed
Centrifugal clutch
2000 rpm max. bit speed
Height, 19 in., Diameter, 21 in.

BUCYRUS ERIE®

BUILDS BETTER EQUIPMENT

News . . .

Continued from page 52

a contractor since 1957. He purchased a Cat No. 955 Traxcavator that year. He also owns two Bucyrus-Erie shovels, a 38-B and 22-B with 1½ and ¾-yd. dippers, a Swedish ½-yd. rubber-tired shovel and two 7-ton Volvo trucks.

Ingo, who specializes in excavation and road construction, also rents out his equipment. "Don't get the idea that I'm the biggest contractor in Sweden," he said. "But it is big construction work for me, you understand."

Soft-spoken 27-year-old Ingo, the son of a stone cutter, is a busy and enterprising young man. In addition to his contracting firm, he operates a used car business, a fishing trawler, a correspondence school and a publishing company; he makes recordings and occasionally models clothes; he has appeared in Swedish films. The husky champion and his brother Rolfe, 23, also tour the country putting on boxing exhibitions. To handle his many varied enterprises, he recently opened a branch office in Stockholm.

It is because of these many activities that Ingo often rents his earthmoving equipment to other contractors.

Besides his brother Rolfe, Ingo was accompanied by his close friend Gustav von Reis, president, and H. R. Conner, executive vice-president and general manager of the Detroit Broach Co., Detroit, Mich. His hosts at Caterpillar were C. A. Barabe, manager of foreign sales, and Oscar von Seegar, sales manager of the European division of Caterpillar Overseas C. A.

Moles to Honor Men From New York, Minnesota

William Denny, Garden City, N.Y., and George Morgan Drake, Minneapolis, Minn., have been named as the 1960 recipients of the awards given annually by the Moles for "outstanding achievement in construction."

The announcement was made November 4 at a dinner meeting of the group, which is an association of leading figures in the tunneling, dam-building and heavy construction industry, at New York's Biltmore Hotel. Formal presentation of the honors will be at the annual Moles' Awards dinner at the Waldorf Astoria Hotel January 27.

Denny and Drake make up the 20th pair of honorees in a series that started in 1941.

The award is considered the highest recognition that can be accorded for service to the American construction industry. It is made annually to one member of the society, and one nonmember. Denny is the member winner.

Denny, a native of Sedalia, Mo., has served since 1953 as executive vice-president of Merritt-Chapman & Scott Corp., in charge of its construction department. He joined the company in 1927, after nine years of bridge construction experience in Kansas. Current projects under his supervision include Glen Canyon Dam in Arizona, Priest Rapids Dam in Washington state, and the main generating plant of New York's Niagara power project. These three contracts are described by the company as "the three largest competitively-bid contracts ever awarded a single contractor."

Drake, a native of Madelia, Minn., is president and general manager of Johnson, Drake & Piper, Inc., and makes his headquarters in Minneapolis. The company, which he helped form in 1914, maintains an international staff of some 300 administrators, supervisors and engineers, and at some peak operations has employed as many as 40,000 workers.

Equipment You Ought to Know About

Extended-Lift Loader

Manufacturer: J. I. Case Co., Industrial Div., Department EE, Racine, Wis.

Claims: Extra-long lift arms that provide greater clearance for dumping into high-sided trucks, railroad cars and tall hoppers are now available as optional equipment on Case W-9 and W-10 Terraload'rs.

The new arms, two feet longer than standard, give both unit loaders a clear dump height of 11 feet 6 inches with bucket retracted, and 10 feet 2 inches with bucket fully dumped. Forward reach at 7-ft. lift height is 89 inches. Standard SAE rated bucket sizes for the new high-lift models are 1¼ cubic yards for the W-9 and 1⅛ yards for the W-10, with 1⅝ and 2-yd. buckets (respectively) available for handling light materials. Carry capacities at 4 mph are 3,750 pounds for the W-9 and 4,500 for the W-10, compared with 6,000 and 6,500 pounds for standard models.

Both of the 4-wheel drive loaders are powered by Case engines and feature constant-mesh hydraulic transmissions with on-the-go power-shift through three forward and three reverse speed ranges. Extra-wide wheel tread, low center of gravity, better fore-and-aft weight distribution and full-power rear-

Continued on page 60

OWEN BUCKETS

new center line reeving doubles cable life

"Our new OWEN Bucket is great. That new center line reeving more than doubles our cable life," says Kenneth Muster, Supt. for R. F. Muntz, owner of the Hugo Sand and Gravel Co. of Kent, Ohio.

The tandem positioning of the lower closing sheaves permits the closing line lead to pass directly through the center of the head of the bucket. This exclusive OWEN feature eliminates excessive bending of the cable, resulting in increased cable life experienced by Hugo Sand and Gravel. It also permits the bucket to hang plumb from the crane boom.

"Our operation is tough on a clamshell, but all these improved OWEN features have greatly reduced our maintenance costs and cut down-time," claims Mr. Muster.

This OWEN Clamshell, with all moving parts lubricated . . . with all arm and sheave pins, plus the main shaft, having triple lip grease seals . . . has heavily cut the high maintenance expense of handling this sand suspended in water that comes directly from the wash plant.

Send us your requirements.
OWEN Engineers are at your service at all times.

The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO
BRANCHES New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

NOT in the Contract

One of the national surveys, conducting a confidential Kinsey-type research, recently sent out forms to the graduates of several colleges from lists supplied by the schools. It was stressed that the informants would be used for research only, and their answers would be treated as highly confidential material.

One alumnus returned his form with a pencilled comment: "In my opinion, sex is a subject to be discussed with women—not with an International Business Machine."

"What's the matter, little boy?"

"Ma's gone and drowned all the little kittens."

"Oh, that's too bad."

"Yeah, she promised me I could do it."

A student in the English class fell asleep as the professor was reading one of the Canterbury Tales. Annoyed when he saw it, the professor let fly with the book, bouncing it off the sleeper's head.

"What hit me?" cried the victim.

"That," said the prof, "was a flying Chaucer."

The local weatherman was so often wrong in his predictions that he became the laughingstock of the community. He, therefore, applied for transfer to another station.

"Why," wrote headquarters, "do you wish to be transferred?"

"Because," the forecaster replied, "the climate doesn't agree with me."

When one of the town's more prominent citizens was nearing his 90th birthday, the local newspaper sent a reporter to interview him. "Tell me, sir," the newsman asked, "What exercises do you do to keep fit?"

"My boy," the oldster replied, "when you're pushing 90, that's all the exercise you need."

Wife: "You know, I suspect that my husband has a love affair with his stenographer."

Maid: "I don't believe it. You are just trying to make me jealous."

"That isn't what I had in mind, Mr. Willoughby, when I asked for references to prove you're a fast, smooth operator."

The young man was walking along the street when he heard screams of anguish coming from a nearby house. He ran to investigate and found a frantic mother whose son had swallowed a quarter. Seizing the youngster by the heels, the stranger turned him over and gave him a few firm thumps and shakes, and the coin rolled out onto the floor.

The grateful mother was lost in admiration. "You sure knew what to do to get that quarter out of him," she remarked in a relieved voice. "Are you a doctor?"

"No, ma'am," the young man replied. "I'm with the Internal Revenue Service."

A socially ambitious young woman made her husband's life miserable trying to get him to rent a more expensive apartment. One evening he came home in a good humor. "Good news, dearest," he cried. "We don't have to move. The landlord just raised the rent."

There was a farmer who was a cold dispassionate man. A year after marriage, he made violent love to his wife after a sprint across the field. Three years later, he again sprinted across the field. She held her arms out expectantly.

"Sex maniac!" he growled, "there's a fire in the barn!"

"I'm going to spread some manure over the lower 40," the farmer casually mentioned to his wife at breakfast.

Soon as he'd left the room, his daughter—just back from finishing school—pleaded with her mother, "Can't you get Dad to say 'fertilizer' instead of that perfectly horrid word 'manure'?"

"No," replied mother. "I'm leaving well enough alone. You should have heard what he said before I taught him to say 'manure'."

The newly appointed justice was not familiar with the code, and when a bootlegger appeared before him to plead guilty he was at a loss to know what to assess him. He called up the old justice.

"I've got a bootlegger here. What shall I give him?"

"Don't give him over four dollars. I never do."

"What's in the fancy vase on the mantel?"

"My husband's ashes."

"Oh, I'm sorry. How long has he been dead?"

"He's not. Just too lazy to find an ash tray."

A Constant Standard of Quality in

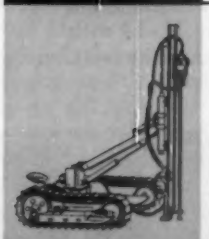
EVERYTHING YOU NEED FOR DRILLING ROCK

DRILLMASTERS

The most productive and versatile primary blast-hole drill ever developed. Completely self-powered and self-propelled. For rotary drilling or percussion drilling with the revolutionary I-R Downhole drill.

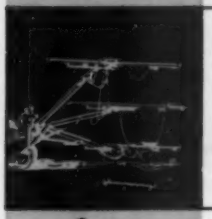
QUARRYMASTERS

The **big** blast-hole drilling rig for heavy-duty service in mines or quarries. Completely self-powered and self-propelled. Can be used as a percussion drill or rotary drill simply by interchanging drill units.



CRAWL-IR DRILLS

The most rugged and completely mechanized crawler drill obtainable. All drill-tower motions hydraulically controlled, converting setup time into drilling time. Tows its own portable air compressor.

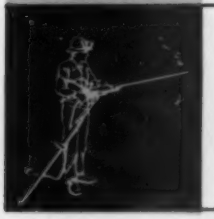


HYDRA-BOOM DRILLING RIGS

Mechanized rock drilling at its rugged best. Heavy-duty hydraulic booms and power-feed drifters for tractor, truck or jumbo mounting. Save manpower—increase production—cut drilling costs.

WAGON DRILLS

Versatile and powerful wheeled units, manually adjustable for drilling in any position. Heavy-duty FM-4 Wagon Drill and light-weight JHM Wagonjack.

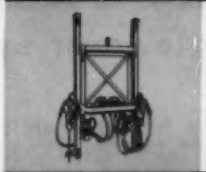


UNIVERSAL JACKDRILLS

The first completely integrated Jackleg drill ever developed. Telescopic feed leg gives full 6-foot feed from an easily-handled 3-foot leg. Five-position throttle and roll-type feed leg valve simplify operation.

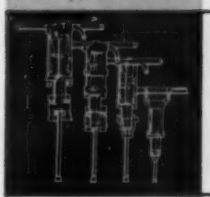
VACUJET STOPERS

The **dustless** I-R stoper drill with built-in jet suction and pressure discharge for fast, clean roof bolting jobs. Only a canvas bag dust collector needed. Use with I-R carset bits and I-R carburized drill steel.



DUAL-DRILL RIGS

Suspended from a side boom tractor, the Dual Drill Rig drills two holes at a time in any trench pattern. Rugged framework mounts dual heavy-duty drifters with long feed. Ideal for pipeline and trench drilling.



JACKHAMERS

A complete line of hand-held percussion drills. A size, weight and drilling power to meet the specific requirements of any job to best advantage. Known the world over for stamina and dependability.

CARSET BITS

The tungsten-carbide insert bit pioneered and perfected by Ingersoll-Rand. High sustained drilling speed in any type of ground. Shoulder drive, bottom drive or tapered socket bits in sizes from 1¼" to 4". Downhole-drill bits from 4¾" to 9".

PAVING BREAKERS

The most complete line of demolition and digging tools available. Six basic sizes, from heavy-duty R-30 slag breaker to light-weight J-10 utility tool. Also a complete line of precision made accessories.

AIR COMPRESSORS

From the world's largest manufacturer of Compressors;—Gyro-Flo portable air compressors from 85 cfm to 900 cfm—Stationary air compressors from 1 hp to 6000 hp.

AIR-LINE LUBRICATORS

Assure proper lubrication for longer life and reduced maintenance of all air-powered rock drills and paving breakers. Operate in any position—automatically feed right amount of atomized oil into air line.

BIT AND ROD SHOP EQUIPMENT

Bit grinders, shank grinders, steel cutters, steel sharpeners and bit and rod furnaces, designed and built by rock drill experts. Everything you need for a well-equipped bit and rod shop.

Your I-R representative is a skilled specialist with wide experience in every phase of rock drilling. Call him whenever you want assistance or advice.

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A choice of transmissions

For All-Out Production...

TL-14 with FULL POWER-SHIFT TRANSMISSION

Exclusive single-lever speed and direction control!

You get more than just a full power-shift transmission with the TL-14 TRACTO-LOADER. You get a transmission that is controlled by ONE LEVER — not two or more levers or a combination of levers and foot pedals.

This means no stopping to shift to get into a higher gear. You go into and out of any forward or reverse gear "on-the-go"—from low to second or high instantly, while moving.

And you get a power-shift transmission that is equipped with a torque converter with a big 3.5-to-1 ratio of torque increase at full stall — more than any other loader its size. Means you get the job done — faster, easier — in toughest going.

If you are after all-out production at the pile, if your hauls are long . . . if loading work is scattered and you want to go from one job to another in a hurry — then the TL-14 with a full power-shift transmission can't be beat. A demonstration will convince you.

The TL-14 has MORE of everything! More Reach — dumps right into center of high body trucks. More Carry Capacity — 5,300 lb. More Breakout Force — 18,800 lb. More Power — 86 hp gasoline, 83 hp diesel. And there's a family of six buckets to choose from — 1 to 3 cu yd.

for a wheel loader

For All-Out Savings...
TL-14 with TRACTOMATIC TRANSMISSION
simple design • economical • power-operated

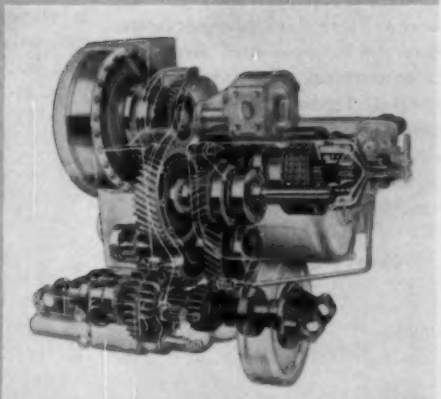
Now you can get a transmission that gives you the ease of operation you want at big savings. The optional TRACTOMATIC transmission for the TL-14 TRACTOLOADER is hydraulically operated and simple in design.

Because there are fewer parts and gears and only two clutches (easy to get at), the price and maintenance of the TRACTOMATIC is considerably less than a full power-shift transmission. This means a lower first cost for the TL-14 . . . lower upkeep, easier servicing throughout its life.

Extensive field tests prove that the TL-14 with a TRACTOMATIC transmission will perform as well or better than other loaders with full power-shift transmissions on short-haul loading and stockpiling.

If you want a good, reliable, easy-operating loader, you can really save money by choosing the TRACTOMATIC transmission for your TL-14. Ask your Allis-Chalmers dealer to show you what it can do. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

FAST, EASY SHIFT — Operator just flips a lever on the steering column to go forward or reverse. Since the reverse speeds are 30 percent faster than forward, you get the extra back-away speed you want without shifting into a higher gear. To get this higher reverse on most other loaders, two separate levers would have to be moved.



HYDRAULICALLY OPERATED — Note the simple, compact design of the TRACTOMATIC transmission in this cutaway. Two multiple-disc clutches — just outside the transmission — are hydraulically actuated and share the work load. One is for forward, the other reverse. As one works, the other rests and cools — an important contribution to long clutch life. Both are accessible for quick adjustment.

move ahead with ALLIS-CHALMERS

...power for a growing world

CIRCLE-D the BIG LEAGUE LIGHT

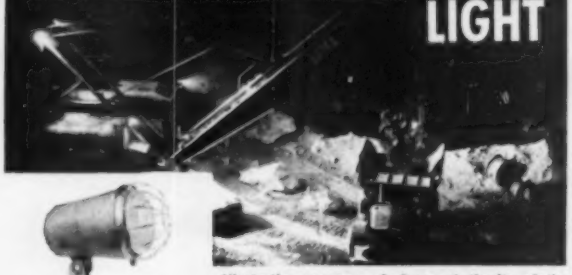


Illustration courtesy of: Power Authority of the State of New York, Niagara Power Project; Uhl, Hall and Rich—Engineers.

Typical lamp assembly for service where heavy shock is encountered. Single light unit mounted on a 202 Junction Flange Base which in turn is mounted on a P-18 Vibration Check Mount.

The above illustration is typical of thousands of installations where HEAVY DUTY CIRCLE-D LIGHTS are a must. Although subject to constant shock and vibration, normal lamp life can be expected—there are three main reasons for this—1. Double cushion lamp support, the patented spring mounted socket and the flexible ring gasket. 2. CIRCLE-D heavy duty shock mount. 3. Internal supported heavy duty filament of CIRCLE-D LAMPS. There are other advantages, such as compact size, light weight, rugged cast aluminum construction, concealed wiring, weather and corrosion resistant throughout. CIRCLE-D LIGHTS are available in wattages from 150 to 1500 per single unit. There is a light for every service and application, U.L. and Coast guard approved for marine use.

Write for CIRCLE-D CATALOG EE

NATALE MACHINE & TOOL CO. CARLSTADT, N. J.

New Equipment . . .

Continued from page 55

wheel steer enable operators to dig, maneuver and dump full payloads faster. Exclusive forward-mounted lift arms permit unrestricted side visibility, plus greater safety for the operator.

Optional equipment with standard or new extra-long lift arms includes V-type and angling snow plows, dozer blade and brush stacker.

Heavy-Duty Truck

Manufacturer: International Harvester Co., Department EE, 180 N. Michigan Ave., Chicago 1, Ill.

Claims: A new series of off-highway heavy-duty trucks with choice of gasoline, LPG or diesel powered engines has been introduced by the motor truck division of International Harvester.

The new 230 series, which includes six basic models in both four-wheel and six-wheel design, offers gross vehicle weight ratings ranging from 46,000 to 73,000 pounds.

Design features include diamond plate steel fenders, heavy-duty brush guard, double-channel heat-treated frame, two new rear axles and a broad selection of heavy-duty optional components.

Gross vehicle weight of the standard 230 four-wheel model is 46,000 pounds. Standard F-230 six-wheeler is rated at 59,000 pounds GVW. With optional 18,000-lb. front axle and 55,000-lb. rear axle, the six-wheel model offers a GVW rating of 73,000 pounds.

Engine availabilities for both four-wheel or six-wheel models are the International Red Diamond 501 six rated at 212 hp; the International V-549 V-8 rated at 257 hp; and Cummins NH, HR and NT series diesels. Both six-cylinder and V-8 powerplants are offered with factory-installed LPG fuel systems.

New rear axle on the standard 230 four-wheel model is rated at 35,000 pounds. Its features include a cast steel housing; high torque capacity planetary double-reduction differential carrier; induction-hardened axle shafts; and forced flow lubrication that insures an adequate supply of lubricant.

A new tandem rear axle, rated at 44,000 pounds, is offered on the six-wheel F-230. It features a planetary double-reduction tandem with the same long-life design as the new single axle.

40-Ton Crawler Crane

Manufacturer: Thew Shovel Co., Department EE, Lorain, Ohio.

Claims: Thew has announced the availability of its 1¼-yd. class Lorain model 56 as a 40-ton crane. The new model is mounted on a 14-ft. long, 13-ft. wide crawler and handles up to 110 feet of boom. The turntable is connected to the crawler by Lorain's "Shear-Ball" connection.

The Shear-Ball is a huge single-race ball-bearing on which Thew gives a 10-year warranty.

The new machine is also equipped with Thew's square-tubular-chord boom which can reach farther and pick up greater loads. Sealed square-tubular-chords of high alloy steel, and sealed round tubular lacings make a lighter weight, stronger boom. Boom-tip extensions may be added up to 40 feet.

"Joy-Stick" air power controls are another feature of the Lorain 56. Using just two levers, the operator controls single or combined operations of all turntable clutches with metered air power. The crawler is also air-controlled making a completely air powered machine.

A torque converter multiplies engine torque automatically as digging conditions require. The engine cannot stall under any digging circumstances. The converter relieves engine, machinery and cables of digging impacts and stresses.

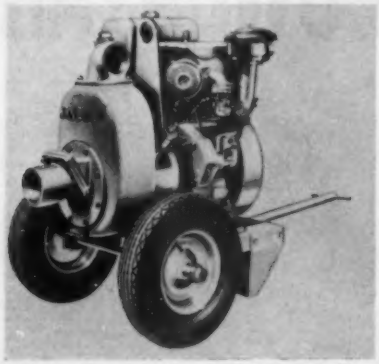
Centrifugal Pumps

Manufacturer: Jaeger Machine Co., Department EE, 550 W. Spring St., Columbus 16, Ohio.

Claims: New Jaeger intermediate and heavy 3-in. contractors pumps are designed to permit quick removal of the entire suction chamber and liner plate without removing the volute. Adjustment, rotation or replacement of the liner can be completed in a few minutes.

Higher performance is also offered. For example, the model 3PN, illustrated next page, will pump all the water a 3-in. suction hose can handle at 5-ft. lift.

With a 4-in. suction hose, it delivers 28,000 gph at 10-ft. lift. Self-priming at 10-ft. lift takes only 15 seconds; requires only 50 seconds at 25-ft. suction lift. The pump is also 30 pounds



lighter than previous model, weighing 395 pounds complete with pneumatic tired truck. It is powered with a Wisconsin AGND engine that has a removable aluminum cylinder head, stellite-faced valve and insert; and positive valve rotators.

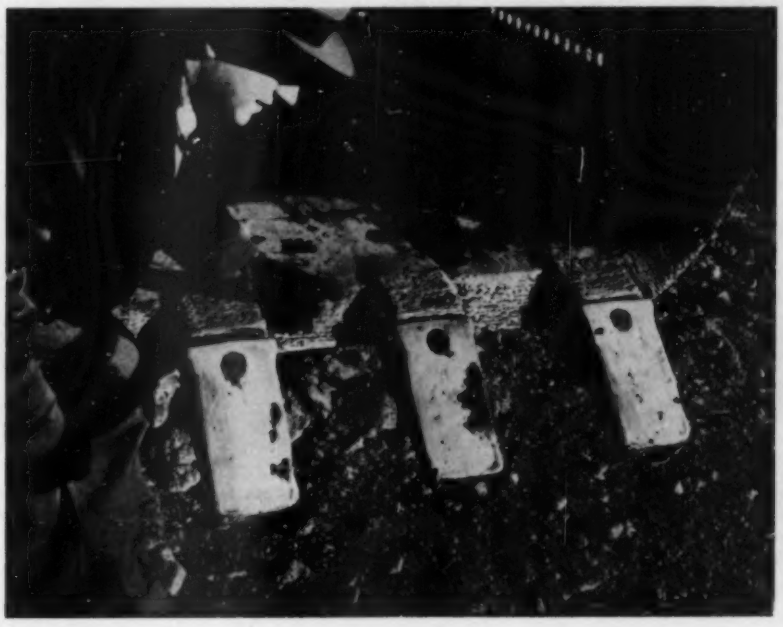
Another new model, the 3XPN, offers the same accessible volute design and comparably stepped-up performance in a smaller capacity pump.

Hardfacing Electrode

Manufacturer: American Manganese Steel Div., American Brake Shoe Co., Department EE, Chicago Heights, Ill.

Claims: Amsco is now offering a new manual tubed electrode for general purpose hardfacing called Amsco 53.

Easy to handle, the new rod features a stable, low-spatter arc with smooth running, outstanding speed and excellent build-up. Specially alloyed for use where both impact and abrasion are a problem, it has proven excellent on crusher rolls (see photo below), hammermills, scraper blades, dipper teeth and similar applications.



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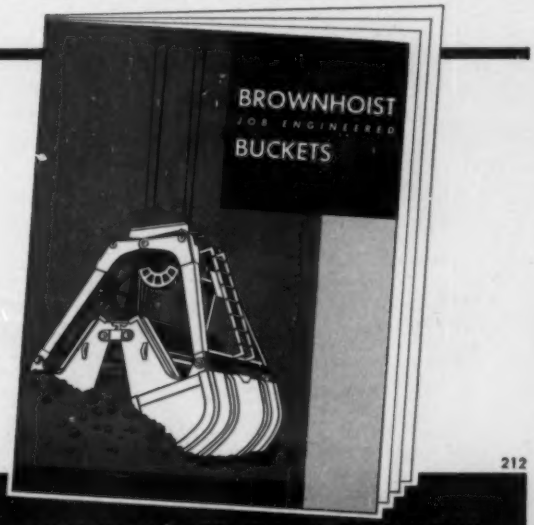
Capacities from ½ cu. yd. to 400 cu. ft.



write to:

212

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY · MICHIGAN

20-Yd. Tournapull

Manufacturer: LeTourneau-Westinghouse Co., Department EE, 2301 N.E. Adams St., Peoria, Ill.

Claims: A new, high-horsepower, large-capacity earthmover equipped with V-8 engine has been announced by LeTourneau-Westinghouse. Named the V-power C Tournapull, it is teamed with a 20-yd. C Fullpak scraper.

The model C's new V-8 optional engine is a 270-hp GM 8V-71 eight cylinder, two-cycle diesel. This power plant develops its rated horsepower at 2,100 rpm, while it reaches maximum torque at 1,200. The high horsepower of the unit, according to L-W engineers, gives it the best power-to-weight ratio in the industry.

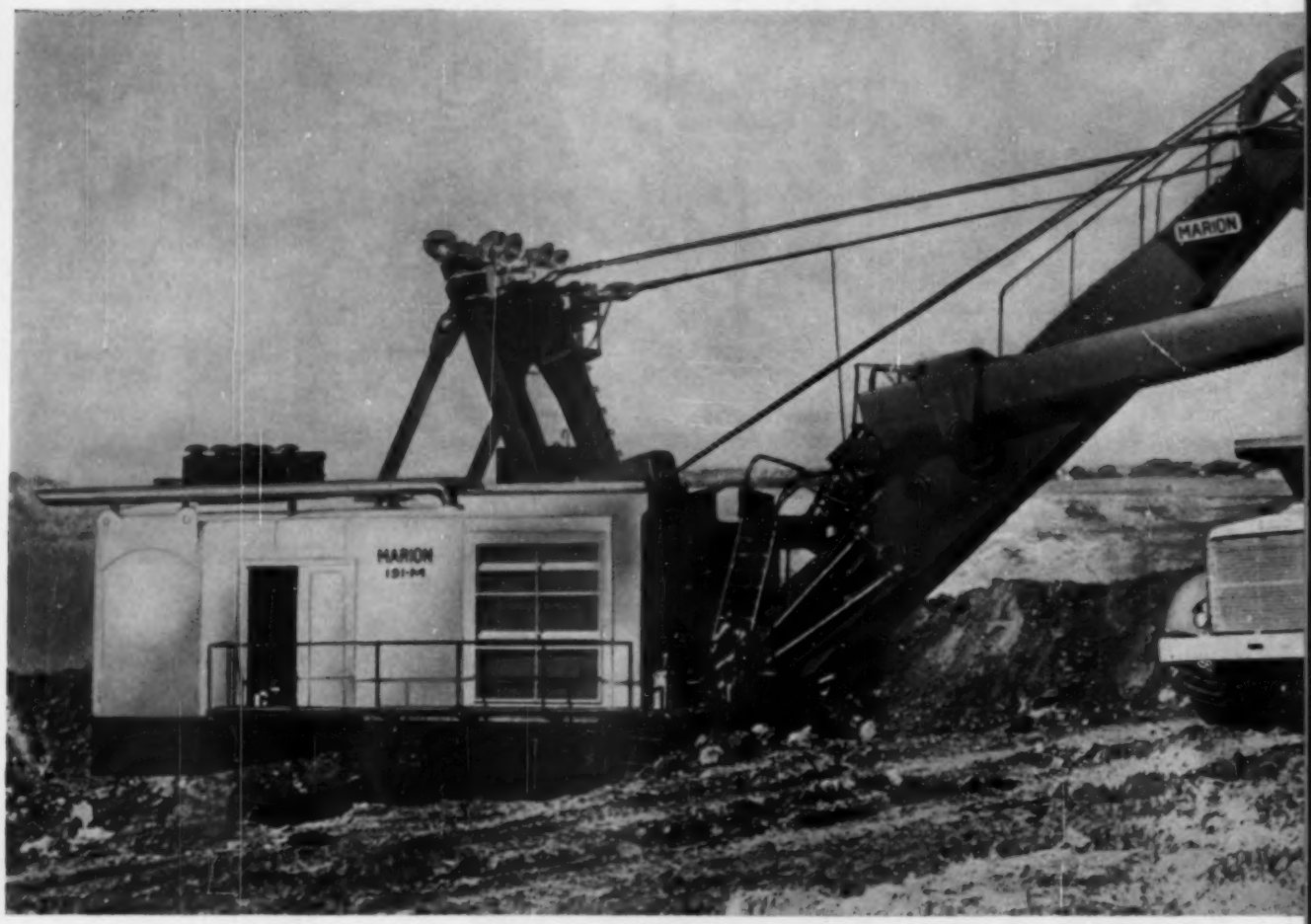
Excellent acceleration is a basic feature of the unit. Its fast acceleration enables the machine operator to reach his haul speed quickly—30% faster than on the standard-powered C.

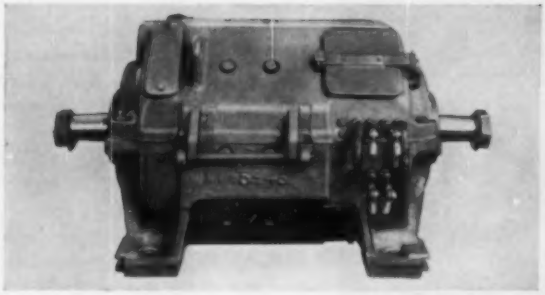
The V-8 engine retains the 2-cycle design for low cost operation and longer engine life. The engine is a 4-valve type, which has four exhaust valves for each cylinder making it cool running, and

Continued on page 64

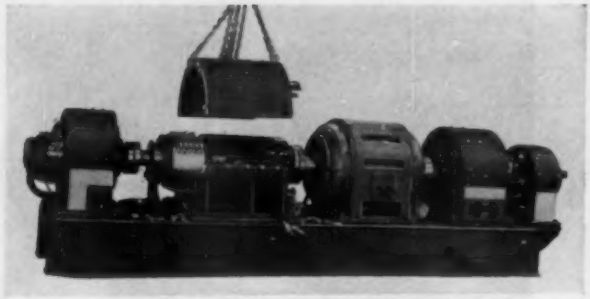
General Electric D-c Drives Give . . .

MORE DIGGING POWER AND



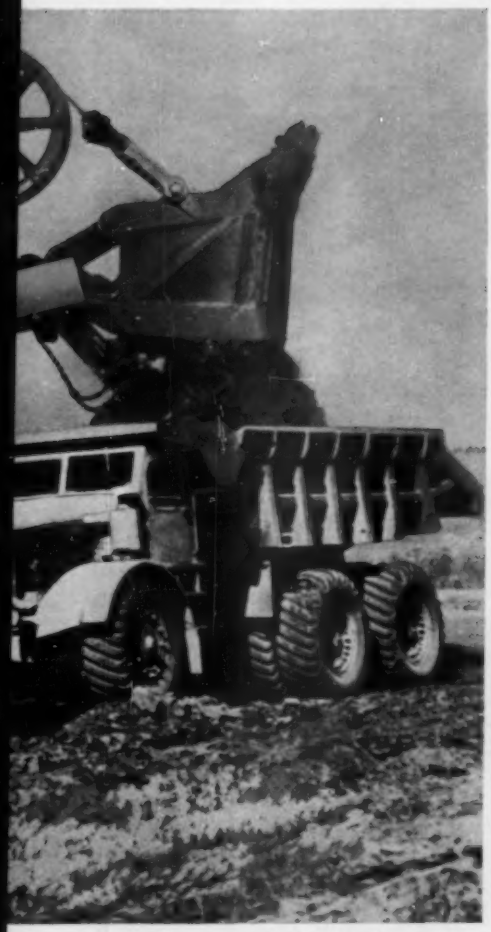


G.E.'s high torque, low inertia direct-current MD motor has large air gaps and advanced insulation system for temperature stability, greater power, and efficiency.



Maximum direct-current output to handle heavy loads is provided by reliable General Electric motor-generator set designed especially for rugged shovel service.

CONTROL AT THE BUCKET



You can move more tonnage faster at less cost with General Electric's powerful, fast responding d-c shovel drive. G.E.'s complete line of rugged shovel motors, reliable motor-generator sets, advanced control and excitation components are *system designed*, job tailored in cooperation with leading shovel builders to give:

More passes per hour, the result of high speeds at light loads and fast power reversal.

More working hours per shift. Low speeds at heavy loads reduce impact, giving reduced downtime and maximum output.

More production. Control system provides faster response of all motions, improved performance, reduced operator fatigue.

Lower power costs. Power returns to the line during stopping or lowering, results in minimum energy and demand costs.

From research to field service, General Electric helps you get optimum performance and economy from your shovel operation. Using computers and other modern tools for analytical work, G-E research and product development personnel evaluate existing and new drive systems, assure continual progress in General Electric d-c shovel drives.

Helping you keep pace with improved shovel drive technology, experienced G-E design and application engineers utilize most advanced materials and components in your General Electric drive system, help you get maximum benefit from your shovel investment.

General Electric d-c drive equipment is thoroughly tested at the factory and inspected in the field by qualified engineers who work closely with the shovel manufacturers.

To assure minimum downtime and maximum performance of electrical components, G.E. maintains one of the nation's most extensive systems of service facilities.

More than 50 service shops offer three-way 'round-the-clock' assistance: repair and modernization of old equipment, help in setting up a modern Productive Maintenance Program, and emergency downtime service.

For more information about General Electric d-c shovel drives and G.E.'s extra value services, call your nearby G-E Apparatus Sales Office, or write Section 827-1, Direct Current Motor and Generator Department, 3001 East Lake Road, Erie, Pennsylvania.

General Electric engineers are available to help solve your electric drive problems, your distribution and mill requirements.

DIRECT CURRENT MOTOR & GENERATOR DEPT.

GENERAL ELECTRIC

ERIE, PENNSYLVANIA

FOR 50 YEARS...
Finest in the Field!
Rely on the bucket contractors rely on. The Omaha Dragline Bucket gives full load with every cast. Perfect balance makes it easy to spot dump. Alloy steel cutting teeth stay sharp, tough and ready. Strike pay dirt now! Complete information and specifications await your letter.
DRAKE-WILLIAMS MOUNT
• OMAHA, NEBR.
OMAHA
DRAGLINE BUCKETS

New Equipment . . .

Continued from page 61

insuring long valve life and complete economical fuel combustion.

An important service advantage is found in that practically all engine parts are interchangeable with other GM series 71 diesels. This minimizes parts spares needed by an owner who has other 71 series power units in his fleet.

The unit's step gear transmission offers 5 forward speeds to 27 mph. A heavy-duty 16-in. double-plate air-assist clutch is standard on the machine. The air-assist is the same type used on the C Speedpull and B Tournapull.

The machine's Fullpak scraper has the same easy-loading characteristics as predecessor Fullpaks. It has a struck capacity of 14 cubic yards and a heaped capacity of 20 cubic yards. It retains the low-angle loading and wide-dirt-entry features which have gained wide acceptance.

The standard C Tournapull with C Fullpak scraper remains the same. It offers either the GM 6-71 engine rated at 226 hp or the Cummins HBIS-600 engine at 210 hp. The standard Fullpak scraper has a struck capacity of 12.2 yards and a heaped capacity of 18 yards.

The new V-power C Tournapull is readily interchangeable with other trailing units designed for use behind the prime mover. Currently available in the C sizes, are a 22-ton rear-dump and a 20-ton crane.

Thread Sealer

Manufacturer: Friesland Plastics Co., Department EE, Friesland, Wis.

Claims: A new plastic tape called Tape-Seal, made from DuPont's Teflon, is now available for sealing threaded pipe joints. Its advantages are said to include: 1) It is applied fast (just wrap once around thread and tear off); 2) it eliminates dripping or splattering (important on remodeling work); 3) is unaffected by temperatures from −250°F to +500°F (advantageous for steam or other high-temperature service, also high pressure hydraulic systems); 4) is completely inert, will not leach out or contaminate, and is unaffected by acids, alkalies or solvents; 5) can be used with equal effectiveness on any type of metal or non-metal; 6) does not harden after application, permitting easy disassembly; and 7) maintains pliable characteristics for easy application in both cold and warm ambient temperatures.

Because of its unique form-fitting properties Tape-Seal does not "ride up" as pipes are joined, but instead lubricates the joint and makes application easier. On-the-job cost is said to average between one and two cents per joint.

Tape-Seal is available in widths of ½, ¾ or 1-in.; in self-dispenser rolls of 250, 500 and 1,000 inches; also in 70-in. do-it-yourself kits. Samples are available on request.

New Trade Literature

Subject: **Pipeline Backfiller**

Content: The Cleveland 190 pipeline backfiller—with its new water-cooled throw-out clutch—is described in a 6-page folder. The throw-out clutch is cooled by continuous circulation of water from the engine's cooling system. It prevents overheating, provides accurate day-long continuous casting control, maintains proper clutch adjustment and adds hundreds of hours to the work life of the clutch components. Photographs show the Cleveland 190 backfilling heavy spoil on big pipelines. One of the first new models in the field backfilled more than 40,000 feet of trench for 20-in. diameter pipe in a 13½-hour stretch.

Where to get: Cleveland Trencher Co., Department EE, 20100 St. Clair Ave., Cleveland 17, Ohio.

Subject: **Rubber-Mounted Crane**

Content: A 12-page catalog contains on-the-job and assembly photos of the Koehring 205 rubber-mounted truck and Cruiser crane. It has a special section devoted to the 205 truck and Cruiser chassis and upper machinery assemblies. Included in these sections are explanations and photos of the upper major shafts, complete with power flow diagrams and an explanation of the enclosed gears.

Where to get: Koehring Div., Department EE, Koehring Co., 3026 W. Concordia Ave., Milwaukee 16, Wis.

Subject: **Motorized Wheel**

Content: An 8-page bulletin explains how General Electric's new motorized wheel for large off-highway mining and excavation vehicles can cut haulage costs. The four-color publication illustrates application and operation of these electric wheels which eliminate the need for axles, transmission, differentials and drive shafts. Drawings indicate types of vehicles which can utilize this new type of drive, and graphs provide statistics on speed, efficiency and tractive effort when either two or four motorized wheels are used. Ask for bulletin GEA-6931.

Where to get: General Electric Co., Department EE, Schenectady 5, N. Y.

Subject: **Cableway Systems**

Content: A 16-page Sauerman brochure covers the handling of ores, sand and gravel, chemicals and other bulk materials by Sauerman machines. A brief history of the company is given in two introductory pages. Four pictorial sections show DragScraper and cableway applications for excavating and hauling; storage and reclamation; engineering and construction; and the marine field.

Where to get: Sauerman Bros., Inc., Department EE, 622 S. 28th Ave., Bellwood, Ill.

Loosens
FROZEN PARTS FAST!
Handy
Won't Leak
Shoots 3 Feet
KANO
Aerokroil
DIRECTIONS
LABORATORIES
Same formula as famous Kroil that has pleased 14,000 industrial users for 10 years or more.
Loosens stuck together metal parts, bushings, bearings, bolts, screws, pipe, etc., "anything from an embalmer's needle to a bulldozer," one customer said.
"Like an extra employee," said another. "Turned rust into mush, put $50,000 equipment back to work."
You too can get these results.
Try Aerokroil at our risk. Send $2 cash, and we'll pay postage.
KANO LABS. 1083 Thompson Lane Nashville 11, Tenn.
12-OZ. CAN $2.
F.O.B. NASHVILLE
CASE OF 12 $18.75

Subject: **Grader, Tractors**

Content: Three new specification sheets are available from Allis-Chalmers. One, designated MS-1325, covers the model Forty Five motor grader. The other two—MS-1192 and MS-1284—give data about the HD-16 and HD-16 DC and D diesel-powered crawler tractors. All three feature cut-away views with marginal notes of the models being discussed, providing an excellent quick and easy reference source.

Where to get: Construction Machinery Div., Department EE, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Subject: **Excavation Case Histories**

Content: Engineers, contractors, public officials and anyone concerned with soil mechanics, earthmoving, land reclamation and general construction will find information of unusual interest in *Men, Methods & Machinery*, just published by Construction Aggregates Corp. The 52-page brochure describes a number of engineering "firsts." From Chicago's shoreline to the Surinam River . . . from Israel's papyrus-clogged Lake Huleh to frozen Canadian lakes, pictorial case histories tell how C. A. C. has devised practical cost-cutting solutions to difficult problems. The brochure is available without charge in either English or Spanish.

Where to get: Construction Aggregates Corp., Department EE, 120 S. LaSalle St., Chicago 3, Ill.

New Movies . . .

Subject: **Tractors, Scrapers**

Content: Euclid has released a new 16mm color-sound film, titled *Power Plus . . . A Matter of Perspective.* This 22-minute movie features Euclid's Big Three products—the S-18 21-yd. struck scraper; the Twin Power TC-12 crawler tractor (425 net hp); and the all-wheel drive, 563-hp TS-24 Twin scraper. The film actually is three features in one, with a section on each of the three products graphically covering design features and application.

Where to get: Euclid Div., General Motors Corp., Department EE, Cleveland 17, Ohio.

Here's why the low-cost Bucyrus-Erie 11-B

is productive more of the time!

There are more time- and money-saving features on this high-speed mobile crane-excavator than any other in its class! From top to bottom it is clean, easy to maintain, easy on the budget. The 11-B is the kind of profit machine that is *not only more productive* but productive more of the time . . . take a look!

2-Section Cab Lets You Get to Machinery Fast!

The streamlined 11-B cab has folding and sliding panels that open up to let you get at the entire main machinery. You can see what you're doing . . . the machine gets back on the job sooner!

Save Clutch Adjustment Time!

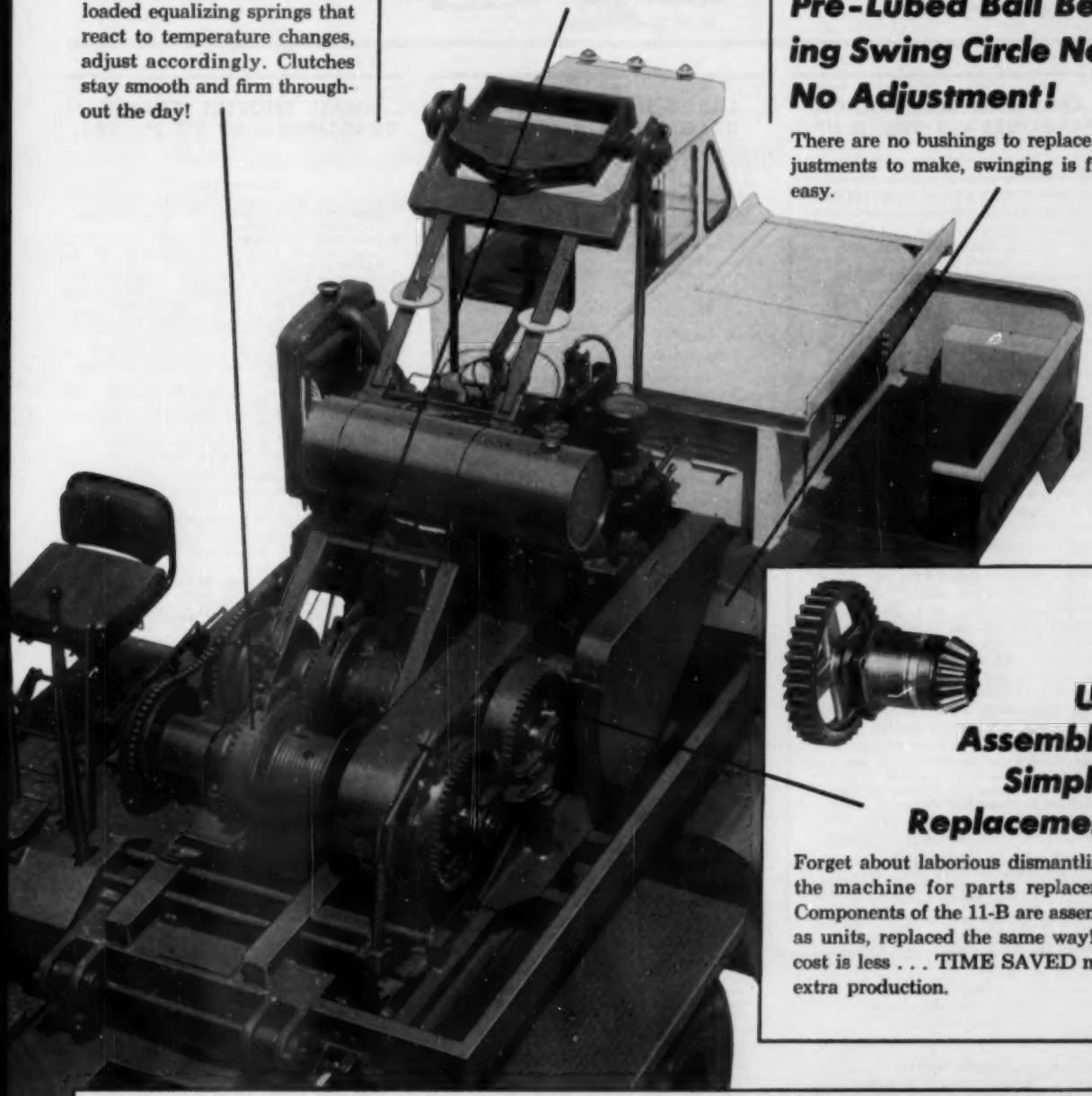
Warm or cool, 11-B clutches perform evenly because of preloaded equalizing springs that react to temperature changes, adjust accordingly. Clutches stay smooth and firm throughout the day!

Clutches Identical... Parts Interchangeable!

Bands are reversible for longer wear; one set is an adequate reserve stock!

Pre-Lubed Ball Bearing Swing Circle Needs No Adjustment!

There are no bushings to replace, no adjustments to make, swinging is free and easy.



Unit Assemblies Simplify Replacements

Forget about laborious dismantling of the machine for parts replacement. Components of the 11-B are assembled as units, replaced the same way! The cost is less . . . TIME SAVED means extra production.

Before you buy *ANY* ⅜ or ½-yd machine, find out the facts on the low-cost 11-B! It is a workmanlike machine, built like a big rig, with quality you just don't find on others in this class! See your distributor . . . he'll arrange a free demonstration to meet your schedule. For additional data, write Bucyrus-Erie Company, South Milwaukee, Wisconsin, Dept. 18EW.

BUCYRUS ERIE®

Builds Better Equipment

TO ADVERTISE: All advertising in this section is payable in advance. Rate: $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters is all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date—10th of preceding month. Example: January closes December 10th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

HEAVY EXCAVATION EQUIPMENT
Draglines—Shovels—Cranes—Drills—Trucks

15-W Bucyrus-Erie elec. drag, 215' 12-yd.
450-W Bucyrus-Erie diesel drag, 165' with extra 10, 12, 13 and 14-yd. buckets.
9-W Bucyrus-Erie elec. drag, 165' 10-yd.
9-W Bucyrus-Erie diesel drag, 165' 12-yd.
7-W Bucyrus-Erie elec. drag, 140' 7-yd.
7-W Bucyrus-Erie diesel drag, 140' 7-yd.
7400 Marion diesel drag, 175' 13-yd.
7400 Marion elec. drag, 175' 12-yd.
625 Page diesel drag, 160' 9-yd.
621-S Page diesel drag, 125' 7-yd.
200-W Bucyrus-Erie diesel drag, 125' 6-yd.
5-W Bucyrus-Erie diesel drag, 100' 6-yd.
2400 Lima dragline 130' 5-yd.
4500 Manitowoc drag, 120' 5-yd.
120-B Bucyrus-Erie elec. drag, 115' 5-yd.
3900, 3500 & 3000 Manitowoc cranes.
111-M Marion drag, 100' 4-yd.
1601 Lima 4-yd. shovel/drag.
1055 P&H drag, 80' 3½-yd.
1201 Lima dragline, 85' 3-yd.
54-B Bucyrus-Erie drag, 80' 2½-yd.
5560 Marion 26-yd. elec. shovel.
5480 Marion 18-yd. elec. H. L. shovel.
151-M Marion 7-yd. elec. shovel.
170-B Bucyrus-Erie 6½-yd. elec. shovel.
4161 Marion 6-yd. elec. shovel.
2400 Lima 4½ and 5½-yd. H. L. shovels.
120-B Bucyrus-Erie 4-yd. elec. shovel.
111-M Marion 4-yd. standard shovel.
1201 Lima 3½-yd. standard shovel.
54-B Bucyrus-Erie 2½-yd. standard shovel.
Large selection of smaller shovels and draglines.
Model T-650 Reich heavy truck mounted rotary and down-the-hole drill.
Euclid trucks—rear and bottom dump.
Truck cranes, dozers, scrapers, attachments.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.,
Hazleton, Pa.
GLadstone 5-3658

Near New
Model 71-B Bucyrus-Erie
Crane (60-Ton)
Used one job only—Less than 500 hours—

Actually like new
160-foot boom—40-foot jib
Adaptable to 3-Yd shovel front or 3½ to 4-yd. bucket as dragline.

Special
Laced tubular cord angle boom
Rigid gantry and counterweights
S/N 118536, powered by model 62306-RD GMC diesel engine—Series 6-110, crawlers 16' 9½" x 36'. For further information, contact

FISHER CONTRACTING CO.
Attn: Jack E. Brown
P. O. Box 6303 Phoenix, Ariz.
Phone: AL 8-7741

120-B Bucyrus-Erie dragline, 100' boom, 4-yd. 2200/2400 volt, 60-cycle. $33,000 spent on entirely new undercarriage just before closing down job. Balance of machine in good condition. Priced at $55,000.

CLEVELAND BROS. EQUIPMENT CO.
Frackville, Pa. Phone 701

Euclids—Rear, Botton and Scrapers

12-yd. Bucyrus-Erie dragline.
9-yd. Bucyrus-Erie dragline.
6½-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie dragline.
2½-yd. Bucyrus-Erie shovel and dragline.
5-yd. Manitowoc dragline.
6-yd. Lima dragline.
Other equipment available, not listed above.

WILLIAM LUBRECHT, III
Construction Equipment
211 W. Diamond Ave. Hazleton, Pa.
Phone: GLadstone 5-4041 or 5-0253

1—Bucyrus-Erie model 175-B dragline, electrically driven with 125 foot boom and 5-yd. bucket. Travels on rails and mats. Considerable spare parts also available. Contact Mr. J. N. Becker, at

POLK EQUIPMENT CO., INC.
P. O. Box 1016 Bartow, Fla.

Bucyrus-Erie 200-W diesel walking dragline, 125-ft. boom, 5-yd. bucket. S/N 762. Cooper-Bessemer FW-6 engine and complete electric light plant. Location western Pennsylvania.

EXCAVATING ENGINEER
Box 2750
South Milwaukee, Wisconsin

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie model 10-B crane—dragline combination Sn. 19563 powered by Buda gasoline engine. Engine recently completely overhauled. Machine in good condition.
Bucyrus-Erie model 10-B shovel, backhoe, crane, combination Sn. 64045 powered with Buda gasoline engine. Recently painted. Very good condition.
Shovel front for model 15-B Bucyrus-Erie machine, like new. Priced to sell.
General Electric, 31 KW electric set powered by Hercules gasoline engine mounted on 1½ ton Mack truck. Excellent condition. Ready to go.

STEEL BROTHERS
3315 Olive Phone: ADams 2-6900
St. Joseph, Mo.

---

2 Used Link-Belt model K580 crawler shovels. 2½-yd. dippers, single electric motor drive, 440 volts, 3 phase, 60 cycle. Good condition, cheap.

CROOK CO.
2900 Santa Fe Ave. Los Angeles 58, Calif.
Phone: LUdlow 8-7214

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Houston, Texas

Bucyrus-Erie 15-B hoe, S/N 59821, IHC UD-9 engine, tractor type tracks. Or as dragline only, (no bucket) reconditioned.
Bucyrus-Erie 22-B (std) hoe, S/N 119144, Esco ¾-yd. bucket, IHC UD-525 engine. Or as dragline only (no bucket), rebuilt.
Quickway E dragline, S/N 5560, 25' boom, IHC UD-9 engine, mounted on IHC L-184 tandem axle (single drive) truck. Reconditioned.
Bucyrus-Erie 22-B (std) dragline, S/N 56343, 45' boom, pendant suspension, IHC UD-14 engine.
Schield-Bantam C-35 dragline, S/N 6377, Continental 6-cyl. gas engine, 30' boom, 16" shoes, ⅜-yd. Page bucket.
Lorain TL-25 ¾-yd. backhoe, S/N 23276, Cat D315 engine, 22" shoes.
Bucyrus-Erie 15-B hoe attachment (straight boom).
Bucyrus-Erie 22-B unit 20-A hoe equipment, ¾-yd. Esco bucket (cambered boom).

Dallas, Texas

Bucyrus-Erie 15-B dragline, S/N 72928, ½-yd. dragline bucket.
Bucyrus-Erie 15-B S/N 118931, 40-10 dragshovel, Cat D315 engine, Unit LB 35' dragline boom attachment with fairlead. Unit 3 clamshell equipment, 604 Blaw-Knox ½-yd. clamshell bucket, like new.
Bucyrus-Erie 22-B comb. 60-10 clamshell excavator, S/N 119704, 45' boom, Unit 79 extra counterweight, tractor type tracks, Cat D318 engine, ¾-yd. Blaw-Knox clamshell bucket, excellent condition.
Lorain 41 dragline, S/N 14432, good condition.
Northwest 25 dragline, S/N 11313, 40' boom, GM diesel engine, reconditioned.
Insley K12, backhoe, S/N 55690, good condition.
Schield-Bantam T-35 backhoe attachment.
Link-Belt LS-50 backhoe attachments, and shovel attachment.
Marion 362 backhoe attachment.
Bucyrus-Erie 10-B shovel attachment.

Lubbock, Texas

Bucyrus-Erie 15-B combination 40-10 hoe, S/N 118936, 34" blade type side cutters, D315 Cat engine, battery lighting and electric starting, tractor type tracks, 1,500 lbs. extra counterweight, like new.

BROWNING-FERRIS MACHINERY CO.
Dallas
305 Exposition Ave. TA 3-8121
Greggton
Hwy. 80 PL 9-2761
Lubbock
2424 Clovis Rd. PO 5-7455
Houston
2619 Texas Ave. CA 3-3231

Caterpillar 1T4 loader. Ready to go. Good operating condition. St. Joseph, Mo.
International TD-18 with necessary change-over to make it a TD-18A. Very good condition. Need to sell. Chillicothe, Mo.
Practically new Bucyrus-Erie 11-B Transit Crane with extra boom. Used very little. Price reduced greatly. Chillicothe, Mo.
Slightly used Caterpillar #60 scraper. $1,500 off of new price. Chillicothe, Mo.
Practically new Rome TAW 20-28 disk. Will sacrifice. Chillicothe, Mo.
LaPlant Choate B75 hydraulic pump. Complete for 3T series, Caterpillar D7. Used very little since rebuilt. Chillicothe, Mo.
Used blade with push arms for Caterpillar D8. Good serviceable condition. As is guarantee. Chillicothe, Mo.

MIDLAND MACHINERY CO.
St. Joseph, Mo. Chillicothe, Mo.
ADams 3-2516 MIssion 6-2080

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Excavators

1—Bucyrus-Erie 22-B powered by Cat D318 equipped as a hoe. This machine will meet with your approval.

1—Model L Quickway ½-yd. machine mounted on Federal truck. We have made minor repairs to this unit, it looks very good.

Asphalt Equipment

1—Barber Greene Laydown machine, 879A powered by Le Roi gas engine. The general appearance of this machine is very good.

1—848 Barber Greene asphalt plant, equipped with feeder, bucket elevators, rotary drier, gradation unit, dust collector, pug mill, Cleaver Brooks steam boiler, GM model 4-71 engine, Caterpillar model D13000 engines, also electric motors, wiring cables and panels that make this plant complete. We welcome inspections of this plant.

1—Universal jaw crusher 12" x 36" with removable wedges allowing expansion to 15" x 36" opening.

Trucks and Bottom Dumps

2—Euclid 7LD rear dumps S/N 8887 and 8888 powered with Buda diesel engines, equipped with Parkersburg Hydrotarders, Fuller 5-speed transmission. These trucks are operable. Price $5,000 per unit.

6—WD60 Koehring dumptors S/N D-3651, D-3867, D-4202, D-4550, D-4551, D-4009, powered by General Motors diesel engines. These machines rate a very clean classification.

Tractors

1—Near new Caterpillar D9 equipped with push block, front power control unit, new rails, rollers and sprockets rebuilt. This machine was new in June of 1958.

1—Allis-Chalmers HD-21 equipped with power control unit, front and rear push block, and torque convertor. Previous owner had just rebuilt engine and we made extensive repairs to the undercarriage.

1—Caterpillar No. 9 ripper two shanks, a near new ripper at a tremendous savings.

Misc.

1—Wagner model "C" Scoopmobile powered by UD-14A engine, equipped with scarifier attachment.

1—Woods Roadmixer model 54 powered by Chrysler industrial engine PTO for D8.

1—Buda generator model PCD-1879 BM-D 3091-C Novo gas starting engine connected to Westinghouse generator AC440-volt, 390-amps, 3-phase, 60-cycle Westinghouse excitor. This unit is ready to go to work.

THE COLORADO BUILDERS' SUPPLY CO.
1534 Blake St. Denver 2, Colo.

International model TD-24 diesel tractor, serial TDE-5394, equipped with Bucyrus-Erie straight blade bulldozer, Bucyrus-Erie model P-29 rear mounted double drum cable control unit, seven roller track frame, 22" grouser tracks. Good condition. $10,750.

Allis-Chalmers model HD-20 diesel tractor, serial HD-20H-3461, equipped with torque converter, crankcase guard, roller guards, electric starting, push plate, powered by GM model 6B-1641 diesel engine, serial 62601RA. This tractor has a Caterpillar model 25 rear mounted double drum cable control, serial unknown. Tractor in fair condition. $9,250.

Allis-Chalmers model HD-20 diesel tractor, serial HD-20H-5931, powered by GMC diesel motor, torque converter, crankcase & roller guards, electric starting and push plate. Tractor in fair to good condition. $9,250.

Allis-Chalmers model HD-20 diesel tractor, serial HD-20H-5759, powered by GMC diesel engine, torque converter, electric starting crankcase and roller guards, and push plate. Tractor in fair to good condition. $9,250.

Allis-Chalmers model HD-21 torque converter, diesel tractor, serial No. HD-21A-8528, equipped with Gar Wood model 281 rear mounted double drum cable control unit. Gar Wood straight blade bulldozer, roller guards, crankcase guard, lights, 26" grouser tracks. Good condition. $19,500.

Allis-Chalmers model HD-19 diesel tractor, serial 1603, equipped with Gar Wood model HD-19R straight blade bulldozer, track roller guards, electric starting, lights, torque converter. Tractor in fair condition. $5,200.

Allis-Chalmers model HD-14C diesel tractor, serial HD-14C-6085, equipped with Baker hydraulic controlled angle bulldozer, track roller guards. Tractor in fair to poor condition. $1,500.

SMALL SHOVELS, CRANES, DRAGLINES — UP to 2½ YDS.

Austin Western 10-ton three wheel road roller, serial No. H1-3174, powered by International gasoline engine, equipped with hydraulic steering. Fair condition. Location: Roswell, N.M. $1,250.

Essick model 800 (5-8 ton) tandem road roller, serial U-3536, equipped with 53" dia. x 50" wide guide roller, sprinkling system cocoa mats, hydraulic steering, and powered by Chrysler water cooled gasoline engine. This roller like new. $6,400.

Case model LAI wheel type loaders, serial No. 5223590, equipped with Lull model C-384 shovel loader, ¾-yd. material bucket, electric starting, 7:00 x 20 front tires, 18:00 x 26 rear tires. Good condition. $2,950.

Caterpillar model 70 scraper, serial 8C-1536, equipped with 16:00 x 20 front tires, 18:00 x 24 rear tires, cable controlled. Good condition. $7,500.

International model TD-14 74" diesel tractor, serial No. TDF-21658T2, equipped with 20" grouser tracks, Cardwell hydraulic angle blade bulldozer, Cardwell model PBI-14 pipelayer, hydraulic system repaired, pipelayer completely checked. Fair condition. $5,500.

International model TD-14 diesel tractor, serial No. TDF-20852T2, equipped with Cardwell model PBI pipelayer, serial No. PBI-14-294, with counterweight, less boom, 20" grouser tracks, crankcase guard. Machine in fair condition. $3,700.

Caterpillar model D8 diesel tractor, serial No. 2U-9403, equipped with trackson model MD-8 pipelayer, counterweights, crankcase guard. Tractor in fair condition. Location: Dodge City, Kansas. $9,500.

Caterpillar model D8 diesel tractor, serial No. 2U-6546, equipped with Trackson model MD-8 pipelayer, crankcase guard, electric starting. Tractor in fair condition. Location: Dodge City, Kansas. $9,500.

Caterpillar model D8 diesel tractor, serial No. 2U-7940, equipped with Trackson model MD-8 pipelayer, electric starting, counterweights, crankcase guard. Location: Dodge City, Kansas. $9,500.

Caterpillar model D8 diesel tractor, serial No. 2U-4875, equipped with Trackson model MD-8 pipelayer, counterweights, electric starting, crankcase guard. Machine in fair condition. Location: Dodge City, Kansas. $9,500.

Caterpillar model D8 diesel tractor, serial 1H-8819SP, equipped with Trackson model MD-8 pipelayer, complete with 18-ft. boom with snatch block, track roller guards. This tractor in good running condition having been cleaned and painted. $8,000.

Ulrich model K-12 elevating grader, serial CE-964-85, complete with 22-ft. conveyor, clutches, conveyor belting. Also equipped with extra cutting disc, return rollers. Fair condition. $3,750.

Waukesha Hesselman 15 KW diesel electric set, serial No. 524254, 220/440 volt, 3-phase, 60-cycle, 1200 RPM, with fuel tank, control panel. Good condition. $1,500.

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P. O. Box 1320 Albuquerque, N. M.

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Thank You

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

¾-Yd. Shovel, Backhoe & Crane

Hansen model 31 crawler backhoe, International UD-6 diesel engine. Price includes shovel and crane attachments. A bargain. U-32 $3,400.

½-Yd. Shovels, Backhoes & Draglines

Austin-Western Badger shovel and backhoe. International UD-9 diesel engine. Good operating condition. F.O.B. Idaho Falls, Idaho. U-116 $3,650.

Unit model 10-20 excavator, S/N 1719. Price includes crowd shovel, dragline, dragline bucket, backhoe attachment. Engine overhauled. Has extra engine and machine parts. Good condition. F.O.B. Idaho Falls, Idaho. U-249.

Link-Belt Speeder model LS-52 crowd shovel. Cat D-315 diesel engine. Very good condition. U-276.

Bucyrus-Erie crowd shovel attachment for model 15-B excavator. Very good condition. U-197.

Link-Belt Speeder model LS-50 shovel. Cat D-4400 diesel engine. Has backhoe and 30' dragline too. 10-ton crane capacity. Engine is in excellent condition and machine in fair condition. U-470. F.O.B. Boise, Idaho. A bargain. $4,500.

¾-Yd. Backhoes & Crowd Shovel Attachments

Bucyrus-Erie model 22-B, S/N 117315. Has straight hoe boom. Powered by International UD-525 diesel. Excellent condition. U-463.

Bucyrus-Erie model 22-B, S/N 115964. Cambered type hoe boom. International UD-525 diesel engine. Excellent condition.

Northwest crowd shovel attachment for model 25. New and unused. U-198.

1-Yd. Crowd Shovel

Bucyrus-Erie model 30-B crowd shovel. Crawler mounted. Powered by GMC 4057C diesel engine. Excellent condition.

1½-Yd. Crowd Shovel

Bucyrus-Erie model 37-B crowd shovel. Powered by Cat 6-cylinder diesel engine. Fair condition.

Dragline Buckets

½-Yd. capacity dragline bucket. Good condition. U-142 $300.

Wellman 2½-Yd. dragline bucket, model DXL. Has never been used. $1,200.

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P. O. Box 1646 TWX No. SU-278
Salt Lake City 10, Utah Phone: DA 2-1241

P&H model 255-A, ¾-yd. shovel, crawler mounted. Powered by Caterpillar model 315 diesel engine. $14,500. F.O.B. Elizabethtown, Ky.

Bucyrus-Erie model 38-B, 1½-yd. shovel, on crawlers, powered by Caterpillar diesel engine. Shovel in excellent condition. $38,000. F.O.B. Elizabethtown, Ky.

Bucyrus-Erie model 51-B, 2-yd. capacity lifting crane with 100' boom and 20' jib. Long and wide under carriage, 40-ton sheave block. Powered by Buda model 6DCB diesel engine. Crane less than 2 years old—has been in our rental fleet, saw very little service, like new condition. Replacement cost approximately $82,000. $69,000 F.O.B. Louisville, Ky.

Bucyrus-Erie model 22-B heavy duty crane, dragline and clamshell 51-20 combination. Powered by International model UD-525 diesel engine. Long and wide tracks. Like new condition. $24,500. F.O.B. Louisville, Ky.

Lorain model L41, ¾-yd. crane, dragline, clamshell combination, 40' boom, tagline and fairleads, pendant suspension. Powered by Caterpillar model 318 diesel engine. $7,500 F.O.B. Louisville, Ky.

Koehring model 304, ¾-yd. shovel on crawlers. Powered by International model UD-14A diesel engine. $5,500 F.O.B. Elizabethtown, Ky.

Lorain model 40, ¾-yd. shovel on crawlers, powered by gasoline engine. $4,500 F.O.B. Elizabethtown, Ky.

Koehring model 304 shovel front attachment ¾-yd. capacity. Like new condition. $1,900 F.O.B. Elizabethtown, Ky.

Bucyrus-Erie model 10-B, ⅜-yd. shovel, crawler mounted, with Buda gas engine. $7,500 F.O.B. Evansville, Ind.

Lorain model TL-20, ½-yd. crawler mounted dragline with 45' boom and powered by Waukesha gasoline engine. $7,500 F.O.B. Evansville, Ind.

BRANDEIS MACHINERY & SUPPLY CO.
P. O. Box 1705 Louisville 1, Ky.
MElrose 7-4741

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Hoes

1—Michigan C-16—½-yd. hoe, ½-yd. 22" bucket, 9'9" crawlers, 20" wide, Hercules gas engine JXD #1742230, machine #3797, 4 years old.
1—Koehring 303—¾-yd. hoe, 30" bucket, 10'6" crawlers, 24" wide, Waukesha gas engine #484150, 4¼" x 5¼", serial #2337.
1—Osgood 200—½-yd. hoe with 22" bucket 11' crawlers, 22" wide, powered by Continental gas engine, machine #6285, 5 years old.
1—Lorain model TL-20 hoe, with Waukesha gas engine, six years old, good condition.
1—Unit model 614 dragshovel, ½-yd. bucket, 20" pads, GM diesel 2055, excellent condition, 4 years old, serial #54308.

Air Compressors

1—LeRoi 315 air compressor on 4 pneumatic tires, 7 or 8 years old.
1—Joy model WK-80, size 105 portable air compressor with gas engine.
1—Gardner-Denver 105 CFM, 2 stage water cooled air compressor, Hercules OXD-5 gas engine with electric starter on 2 pneumatic tired wheels, serial #162853.

Misc.

1—Bucyrus-Erie 15-B—½-yd. shovel attachment —perfect.
1—Schield Bantam 30 ft. crane boom.
1—Wiley PM215 Patchmobile portable asphalt patching unit on two pneumatic tires, complete with rotary dryer. This unit is new.
1—Ruhr M-1—½-yd. heavy duty grapple, new, excellent buy.
1—Wayne 36" rider industrial vacuum pick-up power sweeper, demonstrator, 2 years old.
2—CMC Jetcretes with all accessories. Excellent condition, practically new with all extra accessories.
1—Ross 6-ton pneumatic tires fork lift truck, 10' mast, 14' lift.
1—Used Kennedy Van-Saun revolving scrubber washer screen, 48" dia. x 21'0" long, in excellent shape and complete with all new parts including extra scrubber sections and new sizing screens.
1—Ford 1956—F-600 stake body truck, serial #F602N14988, air brakes, heavy duty dump hoist, 2 speed rear and oversize motor.

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Timonium Rd. & Harrisburg Expressway
Timonium, Md.

Unit model 1020 shovel, serial No. 51256, powered with Chrysler gas engine.
Koehring model 205 shovel and hoe. Serial No. 5262C, powered with International gas engine #17366, 1948 model.
Model 25 Northwest diesel shovel and pull shovel, GMC diesel engine. Serial No. 7723. Located in Seattle.
Model L-41 Lorain hoe with Waukesha gas engine. Serial No. 17832.
38-B straight boom 1½-yd. hoe attachment.

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Model 2460 Warner & Swasey Gradall excavator. Delivered new in 1957, equipped with GMC diesel engine, 24" and 36" buckets and ripper tooth. In good operating condition. Priced to sell.

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EV 4-1900

Bucyrus-Erie model 22-B dragline excavator with 45' boom and Chrysler gas engine. Serial #45336. Price f.o.b. Asheville, N.C. $12,500.
Northwest model 80-D shovel with 2½-yd. Esco bucket, 30" treads, model 21 Murphy serial #13119. Price f.o.b. White Haven, Pa. $26,500.

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Bucyrus-Erie 51-B
New Track Rollers
½ Price

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SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie Hydrohoe attachment for H-3 Hydrocrane complete with 18" general purpose dipper, 20" utility dipper, 12" narrow dipper and all necessary fittings. Excellent condition. Complete. $750.
Lorain model TL-25 serial #19697, with Waukesha gasoline engine, cambered boom backhoe with Amsco rock bucket. Machine completely rebuilt. ¾-yd. shovel front available for this machine. $9,500.
P&H model 150 backhoe, serial #13833 with gasoline engine. 20" dipper and ½-yd. dipper. Good operating condition. $3,500.
P&H model 255A cambered boom backhoe, serial #14436. Excellent value. $5,500.
Northwest model 25, serial #16381 backhoe. ¾-yd. Amsco bucket. Caterpillar D318 diesel engine. Reconditioned and ready to work. $16,750.
Bucyrus-Erie model 22-B cambered boom hoe. Serial #101174. Caterpillar D318 diesel engine. Machine completely rebuilt. Other attachments available.
Bucyrus-Erie model 22-B hoe attachment complete with new teeth. $1,200.

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Model 604 Lima 1½-yd. dragline, equipped with 80' pendant suspended boom, dragline fairlead, long wide crawlers. Cummins diesel engine. Delivered new in 1951. Excellent operating condition. Priced at $22,500 with no trades.

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Practically new Bucyrus-Erie 11-B Transit Crane serial No. 119391, mounted on crane carrier truck with 60' boom, hoe and dragline equipment. Has been rented two months.
Caterpillar D7 tractor, serial No. 3T23666, oil clutch with 7S bulldozer, and #25 cable control unit. Used very little since being completely rebuilt.

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Bucyrus-Erie 51-B shovel equipped with 2½-yd. bucket. Powered by Buda diesel engine model 6DA-970, 36" treads. This machine has had less than a year of work and is in top condition. Price $53,000. Subject to prior sale.

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H-2 magnet crane, serial #81118 mounted on International L-152, serial #76461, equipped with 24" magnet & SKW generator. Machine as is, in operating condition, price complete $5,000.

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1 Northwest 80-D shovel and dragline.
2 Northwest No. 8 draglines.
1 Marion 151-M 6-yd. shovel.
1 Marion 4161 dragline equipped with 120' boom and 5-yd. drag bucket.

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Bucyrus-Erie 15-B dragshovel—½-yd.
Bucyrus-Erie 19-B dragline—¾-yd.
Bucyrus-Erie 22-B dragline.
Hendrix dragline bucket complete—16-yd.
American ¾-yd. shovel & backhoe.
Pioneer 40" x 20" portable roll crusher.
Pioneer 16" x 16" roll crusher.
Portable conveyor 24" x 30' with dozer hopper, gas engine.
Portable conveyor 30" x 55' with 20 HP electric motor.
Portable conveyor 18" x 50' cleated belt with gas engine.
Barber-Greene 879A finisher.
Barber-Greene 702 ditcher.
Barber-Greene 550 loader.
Many other items. Call or write

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Adnun blacktop paver. Excellent machine for laying stabilized base mix. Has been repaired and is in good condition. U-5 $1,400.
Barber-Greene model 879-A asphalt finisher. LeRoi gas engine. Lays 8' to 14' strip. Has been completely rebuilt and is in excellent condition.

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IHC TD-9 tractor cab. Excellent condition. U-76 $100.
Cat D-4 tractor cab. Excellent condition. U-77 $125.
IHC TD-20 tractor canopy. Excellent condition. U-309 $375.
IHC TD-24 tractor cab. Windows new. Excellent condition. U-376 $750.

Crusher

Cedarapids portable crusher and screening plant. 18 x 36 variable twin jaw crusher mounted on semi-trailer with fifth wheel pin. Overall dimension, 41' x 8' wide and 12' high. 4' x 10' vibrating type scalping screen. 27' long x 30" belt discharge conveyor. IHC UD-24 power unit is skid mounted and has outboard bearing. Overall condition is very good. U-389.

Ditchers

Cleveland "Baby Digger" wheel ditcher. 4½-ft. digging depth. Hercules gas engine. Good working condition. U-1 $1,450.
Barber-Greene model 702 trencher with 5" cutting bits. Wisconsin gas engine. Rubber tire mounted. U-372 Bargain price. Good condition.
Parsons model 88 trench liner. 7" paddles on chains, 14" paddles on extra chain. Gas engine. Good condition. F.O.B. Idaho Falls, Idaho. U-373.

Off-Highway Trucks

Euclid model 8 LD rear dump truck, S/N 8956. 19-yd. water-leveled HD rock body. Cummins supercharged HBS 6-cylinder diesel engine. Fuller transmission. Motor is rebuilt and like new. General condition is good. Very reasonable price. Have 4 other Euclid trucks of similar description available for sale or rental.

Scrapers

Be-Ge ST-770 hydraulic scraper, 6-yds. struck capacity. Excellent condition. F.O.B. Boise, Idaho $3,175.
International model 2T-75 scraper, 18-yds. Cummins NTD-6B1 Turbocharged diesel engine. Excellent condition.
Le Tourneau model J-8 scraper, 10-12 yds. Good condition. A bargain. U-472.

Misc.

Fruehauf trailer. Remodeled Army surplus. New condition. U-28 $875.
Joy heavy weight class 58-BH 7⅞" blast hole drill, 1951 model. Includes derrick, electric motor for air compressor and Roto-Clone. Needs approx. 550 cu. ft. air compressor. Condition mechanically fair. Could be converted to diesel at a minimum cost. Price includes some drill steel. U-369.
50-Ton gravel bin & elevator. Elevator has chain buckets and housing. 5-yd. receiving hopper with gate. Discharge chute. 220-volt, 3-phase, 60-cycle engine. Good condition. U-455.
Seaman-Andwall Trav-L-Plant, model DTM47. Self propelled. Pump assembly, spraybar, volumetric meter, relief and shut-off valve, 2-speed rotor and power steering. Main power is GMC 4057C diesel engine. Sub assembly engine is Wisconsin V640. Has never been used. Truly a bargain. U-409.

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1—Caterpillar D6 tractor Sn. 9U26234, equipped with No. 46 hydraulic control unit and 6S bulldozer. Excellent condition, low hours. Priced to sell.

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ADams 4-3475

MISCELLANEOUS EQUIPMENT

Engines

1—Unused Hercules gasoline closed type power unit model QXB-5—6-cyl. 3¼ x 4½"—serial 64474 with PTO and pulley—suitable for 22-T, 24-W, 24-L, 24-W, 27-T, $600 f.o.b. South Milwaukee, Wis.

1—Slightly used ditto—serial 68232—$400 f.o.b. South Milwaukee, Wis.

1—Unused Buda diesel closed type power unit model 6BD-230 6-cyl. 3⅞ x 4½" serial 90634 with PTO—suitable for 22-T, 24-L, 24-W, 27-T, $1,500 f.o.b. South Milwaukee, Wis.

4—Unused Buda gasoline engines model 6B230 6-cyl. 3⅞ x 4½" serial Nos. 374640—374641—375110—375112 with PTO—suitable for 10-B, 22-T, 22-W, 24-L, 24-W—$750 each f.o.b. Erie, Pa.

1—Unused IHC gasoline closed power unit model U-164 4-cyl. 3½ x 4¼" serial 2982-BEL-Q54—suitable for 21-W, 22-W, 22-T—23-P, $500 f.o.b. South Milwaukee, Wis.

1—Unused Buda gasoline engine model 6B273 6-cyl. 3¾ x 4½" serial 374583—suitable for 10-B, $500 f.o.b. Erie, Pa.

1—Used Hercules gasoline engine model GO-298 6-cyl. 3¼ x 4½" serial 3301201—suitable for 15-B—approx. 500 hours operation—$400 f.o.b. Erie, Pa.

1—Slightly used Buda gasoline engine model HP-326 6-cyl. 3⅛ x 4¼" serial 363846—PTO and pulley—structural base—suitable for 22-T, 27-T, 29-T, 60-L—$500 f.o.b. South Milwaukee, Wis.

1—Unused Caterpillar diesel engine model D311 4-cyl. 4" x 5" serial 758791—#2 SAE flywheel—gasoline starting engine—suitable for 27-T, 29-T, $1,500 f.o.b. South Milwaukee, Wis.

1—Slightly used Buda gasoline engine model K428 6-cyl. 4⅛ x 4¼" serial 380842—approx. 400 hours operation—suitable for 22-B $450 f.o.b. Erie, Pa.

1—Unused Waukesha natural gas—gasoline closed power unit model 6WAKU 6-cyl. 6¼ x 6¼" serial 132702 with ICK starting engine—suitable for 48-L, $3,500 f.o.b. South Milwaukee, Wis.

1—Unused Waukesha diesel closed power unit model 6WAKDU 6-cyl. 6¼ x 6½" serial 124921—ICK starting engine PTO with pulley suitable for 48-L—$4,200 f.o.b. South Milwaukee, Wis.

1—Unused Waukesha gasoline starting engine—Model ICK—4-cyl. 2½ x 3½" serial 1029495—$400 f.o.b. South Milwaukee, Wis.

1—Used Cummins diesel engine model LRI-600 6-cyl. 7¾ x 10" serial 89420—suitable for 88-B—f.o.b. San Francisco, Calif.

Above engines offered "as is," f.o.b. the indicated locations, subject to withdrawal or prior disposition.

Mr. J. E. Smart
BUCYRUS-ERIE CO. South Milwaukee, Wis.
SO 2-0900

Tractors

Caterpillar D7, 7S and #25, late 3T series. Completely rebuilt. Bonded buy guarantee. At Chillicothe, Mo.

Caterpillar D7, 7S and #25, late 3T series "oil clutch." In shop making necessary adjustments and repairs. Will be ready soon. Bonded buy. At Chillicothe, Mo.

Caterpillar D7, 7S and #46 hydraulic control, late 17A series. Will be completely rebuilt soon. Bonded buy. At St. Joseph, Mo.

Caterpillar D6, 6S and #46 hydraulic control, 9U18000 series. Completely rebuilt mechanically. Good as new. Bonded buy. At St. Joseph, Mo.

Caterpillar D6, 6S and #46 hydraulic control, 9U15000 series. In shop being rebuilt at St. Joseph, Mo.

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MIDLAND MACHINERY CO.
St. Joseph, Mo. **Chillicothe, Mo.**
ADams 3-2516 **MIssion 6-2080**

MISCELLANEOUS EQUIPMENT

Truck Cranes

Bucyrus-Erie 22-B, 20-ton Transit Crane, with 75' boom, 30' jib, telescopic boom stop, mounted on a Sterling carrier, 10 11.00x20 12-ply tires, gas engines. Excellent condition. $21,500.

Northwest No. 25 truck crane, 40' boom, fairlead, telescoping boom stop, outriggers and floats, Dart carrier 10 11.00x20 tires and gas engine. Good operating condition. $16,000.

P&H model 150 ½-yd. truck crane, 35' boom, includes gas driven generator and controls to operate 39" magnet (does not include magnet), factory carrier with 11.00x20 14-ply tires, gas engines. Operating condition subject to inspection. $7,500.

Shovel

Northwest 80-D, 2½-yd. shovel, S/N 15898, 30" tracks, 25' boom, 22"-6" stick, Murphy diesel engine. Recondition—30 day guarantee. $42,500.

Gradall

Gradall model 2460, powered by Minneapolis Moline gas engine, 36" bucket with teeth mounted on factory carrier 10 9.00x20 10-ply tires. Good operating condition. $15,500.

Tractors

Four (4) Allis-Chalmers HD-21A charged tractors, 26" tracks, crankcase guard, track roller guards, canopy top, front pull hook, lights, push block and double drum P.C.U. Excellent condition. 30 day guarantee. Each $17,500.

Caterpillar D8, 24" tracks, high output engine, electric starter, crankcase guard, canopy top, and Cat 8S hydr. bulldozer and No. 46 hydr. control. Reconditioned 30 day bonded guarantee. $16,500.

Scrapers

Four (4) Euclid S-18 tractor-scrapers, Allison 3-speed torqmatic drive with model 28 SH 21-yd. heaped scrapers, 4 27.00x33 tubeless tires. Good operating condition. Each $29,000.

Six Caterpillar DW20 tractors with Cat No. 20 scrapers. 20-yd. heaped capacity. Good operating condition. Each $25,000.

H. O. PENN MACHINERY CO., INC.
140th St. & East River **New York 54, N. Y.**

3—Bucyrus-Erie 71-B tunnel front end attachments. $6,500 each. Excellent condition.

THE W. I. CLARK CO.
Box 301 **New Haven, Conn.**

Following attachments were removed from model H-3 Hydrocrane stock: H-EQ-1 hoe equip. w/18" bucket, 20" utilities dipper with sidecutters, ⅜-yd. clamshell bucket, tagline reel, 3¼" heavy duty digging ram. Net cash price complete $2,000.

SYRACUSE SUPPLY CO.
294 Ainsley Drive
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Unit 45 tagline reel complete with fittings, hose and guard for H-3 Hydrocrane, good cond. Price FOB Minneapolis, Minn. $150.

THE ZECO CO.
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Minneapolis 14, Minn.

Ingersoll-Rand Drillmaster

Mounted on International FD 190 truck 600 CFM rotary compressor. 3—48" jacks; 100' 4" drill pipe. Excellent condition. Eastern Pennsylvania location.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton National Bank Bldg.
Hazleton, Pa. **GLadstone 5-3658**

MISCELLANEOUS EQUIPMENT

1—Caterpillar diesel electric generator set, 200 KW, 440V—3-phase, 60-cycle. Powered by Caterpillar model 375 diesel engine, complete with floor type panel board with standard instruments and air starter. Generator serial No. 55C8499, engine serial No. 18B158, less than 2,800 hours operation, (replacement cost $27,000) $11,500 FOB Louisville, Ky. Write, wire or phone Jim Waddell.

BRANDEIS MACHINERY & SUPPLY CO.
P. O. Box 1705 **Louisville 1, Ky.**
MElrose 7-4741

EQUIPMENT WANTED

Surplus wire rope for use as drag and hoist lines on large dragline machine. Sizes 1⅛", 1¼", 2" and 2¼". Send specifications and prices to:

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Wanted by March 1, 1960: 50 to 60-ft. crane boom with Rudomatic or similar tagline assembly with drum lagging and other parts to convert 955A P&H #15002 from shovel to crane. Would consider trading shovel front for crane boom assembly.

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Your Caterpillar Dealer's lot holds the best selection of used earthmoving equipment buys on the market. Here's why: His business is active—and he reconditions, classifies and guarantees his trade-ins so you *know* what you're getting. Here's how:

1 A **"BONDED BUY"** on used Cat-built equipment is your safest buy. It's a bonded guarantee, up to $10,000 of satisfactory performance on *all* parts during the guarantee period.

2 A **"CERTIFIED BUY"** covers units of any make in good condition. This type of protection carries your dealer's written guarantee of satisfactory performance.

3 A **"BUY AND TRY"** deal is just what its name implies. This protects you with your dealer's written money-back agreement.

Only Caterpillar Dealers offer this protection. You'll find your dealer listed in the Yellow Pages. For your best buys in used equipment, visit his lot today!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BEST BUYS IN NEW AND USED EQUIPMENT

Notes from the Manufacturers

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has named James A. Scoggin to the newly created position of general service manager, Construction Machinery Div. Scoggin joined Allis-Chalmers as a student engineer in 1938. He later became an engineer with the Tractomotive Corp. at Deerfield, Ill., and recently was named vice-president, sales and service. When Allis-Chalmers acquired Tractomotive last June, Scoggin continued with Allis-Chalmers as its Deerfield Works sales and service manager. J. T. Skinner is appointed sales manager, Deerfield products. He was sales manager for Tractomotive when Allis-Chalmers acquired it, and continued in that capacity.

Atlas Powder Co., Wilmington, Del., has appointed Stephen M. Wilson, Jr., to the new post of field sales manager of the explosives sales department. Other changes in the sales department organization included appointment of J. W. Cochran as manager of the Chicago (Ill.) district, succeeding John F. Flippo, who replaces Wilson as manager of the eastern district in Wilmington.

Bros. Inc., Minneapolis, Minn., has appointed Tom Kelly as specialist in charge of its road machinery heating division. Kelly will be in charge of marketing bituminous heating and handling equipment.

J. I. Case Co., Racine, Wis., recently appointed Donald H. Mitchell manager of its newly-formed industrial products division. A navy veteran of World War II, Mitchell graduated from Purdue University in 1949 with a degree in mechanical engineering. He immediately joined J. D. Adams Co., where he eventually became district manager. When Adams merged with LeTourneau-Westinghouse Co., Mitchell was placed in charge of sales training. He left this post to become district representative and rose to eastern sales manager after 18 months. As manager of the Case industrial products division, Mitchell will be responsible for product training, sales training, market analysis and dealer training.

Clark Equipment Co., Elgin, Ill., has appointed Scott C. Ashton as New York district sales manager for the company's Brown Trailer Div. Ashton will be headquartered in the division's Linden (N.J.) branch office and will be responsible for all division operations in the New York and New England areas. He was a Brown Trailer dealer for 15 years.

Cooper-Bessemer Corp., Mount Vernon, Ohio, has named Laurence B. Hume as assistant manager of power engine sales. Hume will work under R. Spetka, sales manager, and will be responsible for the application and sales of gas, diesel and gas-diesel engines.

Koehring Co., Milwaukee, Wis., has named Excavating & Paving Equipment Co., Charleston, W. Va., distributor in West Virginia for its Koehring and C. S. Johnson divisions. The new distributor will handle the Koehring line of crawler and rubber-mounted crane-excavators; 16-E and 34-E pavers; longitudinal and transverse finishers; mud jacks; Dumptors, Sprawlers and Skoopers; and the Johnson line of transit-mix plants, automatic plants and other concrete equipment. The firm serves the state of West Virginia with the exception of four counties in the northwestern portion of the state and five counties in the northeastern section. Heber L. Pittman is president of the firm.

Nordberg Mfg. Co., Milwaukee, Wis., has named Harold N. Propp as assistant western branch manager in San Francisco, Calif. Eugene T. Daum has also been appointed as a sales engineer in the St. Louis (Mo.) office. Propp, formerly district sales manager at the St. Louis office for six years, will assist T. D. Davis in serving crusher, screen and process machinery users in the seven western states. Daum was formerly an assistant sales engineer at the Milwaukee office.

SPECIAL REPORT TO CATERPILLAR OWNERS

CAT CATERPILLAR

Parts you can trust.
Dependable round-the-clock service.

CATERPILLAR PARTS ASSEMBLY EXCHANGES LET YOU
TRADE DOWN TIME FOR MORE GO TIME

Here's news about the time-saving, money-saving plan offered by your Caterpillar Dealer. It works this way:

1. Place your order for a parts exchange assembly that is available from dealer stock.
2. Remove your worn assembly and install the reconditioned unit.
3. Send your machine back to work and return the worn unit for credit.

Do-it-yourself repairs to parts assemblies must be weighed against earning losses. What would your equipment earn for you *during the extra time* it takes to repair parts assemblies? You can eliminate earning losses of this type and still pay no premium. Your equipment can actually be making money for you, when otherwise it would be down.

Cat assembly exchange units are guaranteed by your Caterpillar Dealer and can be ready to go on just as soon as the worn assembly is off. The cost? The cost compares favorably with the actual cost had you done the repair work yourself—often less because of the availability of special equipment and serviceman's skill in your dealer's shops.

You can exchange with confidence. When you purchase a Caterpillar Exchange Assembly, you can be sure it's been reconditioned by trained experts using authorized techniques, and only *genuine* Caterpillar parts are used. Every assembly exchange item is backed 100% to be in first-class condition.

Any way you look at it, Cat Parts Assembly Exchange is a good deal. You get a dependable, guaranteed exchange unit at approximately the same cost had you done the job yourself—and the time saved can be converted into cash by having your machine working and earning. Contact your dealer today for his list of Parts Assembly Exchange Units and prices.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

EQUIPMENT RENTAL AVERAGES DURING 1958*
as compiled by Associated Equipment Distributors

CRAWLERS	PER DAY DIRECT DRIVE	PER DAY TORQUE CONVERTER
D9	$296.00	$386.00
D9 w/No. 9A Dozer	367.00	457.00
D9 w/No. 491 Scraper	497.00	507.00
D8	211.00	330.00
D8 w/No. 8A Dozer	270.75	398.25
D8 w/No. 463 Scraper	366.00	485.00
D7	142.00	
D7 w/No. 7A Dozer	188.25	
D7 w/No. 435 Scraper	265.00	
D6	107.00	
D6 w/No. 6A Dozer	148.50	
D6 w/No. 60 Scraper	179.75	
D4	74.75	
D4 w/No. 4A Dozer	109.50	
D4 w/No. 40 Scraper	113.40	

MOTOR GRADERS	PER DAY
No. 14	$138.00
No. 14 w/Scarifier Attach.	149.00
No. 12	117.00
No. 12 w/Scarifier Attach.	125.75
No. 112	93.00
No. 112 w/Scarifier Attach.	110.85
WHEEL TRACTORS w/2-WHEEL SCRAPER	
DW21-No. 470	$382.00
DW20-No. 456	482.00
DW15-No. 428	205.00
TRACTOR LOADERS, FRONT END LOAD and DUMP	
No. 977	$199.00
No. 955	108.00
No. 933	85.75

*Figures are national average rates and in no way reflect the going rate in any area, and cannot be so used. Actual rental costs vary depending on local practices and conditions.

SERVICE TIP

BEFORE you begin to tear down your equipment to remove a parts assembly, check with your Caterpillar Dealer on availability and delivery. The big advantage of Parts Assembly Exchange is in having the reconditioned unit ready to go on as soon as the worn one is off.

CATERPILLAR

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YARDS AHEAD

WHEN PRODUCTION COUNTS

HEAPS IN A HURRY — cuts minutes from the miles . . . That's why the Curtiss-Wright CW-215 moves the most dirt — makes the most profit for contractors like R. C. Wetherall, shown here working on a West Virginia road job . . . This hustling pair of 215s consistently pack in heaping loads of clay, shale and rock — and really keep the pusher operator hopping to keep up with their fast cycles.

UNUSUAL MACHINE? Not really! You'll find the same high performance in the entire CW line — from the 7 cu. yd. CW-27 to the big CW-226, largest two axle scraper on the market. Check any model against your job requirements . . . put "Yards Ahead" performance to work for you.

AD NO. 52-45

CURTISS-WRIGHT MODEL

215

CW-215 SELF-PROPELLED SCRAPER

Capacities: 15 cu. yds. struck, 21 cu. yds. heaped, 42,000 pound rated load

SALES • SERVICE • PARTS

at your

CURTISS-WRIGHT DISTRIBUTOR

SOUTH BEND DIV. CURTISS-WRIGHT CORPORATION, SOUTH BEND, INDIANA

SOUTH BEND DIVISION

CURTISS-WRIGHT

CORPORATION

SOUTH BEND, INDIANA